DOCTOR OF PHILOSOPHY

The Effectiveness of Information and Communication Technology in Schools on Generic Skills Development
Teachers, Pupils and Employers Perceptions

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THE EFFECTIVENESS OF INFORMATION AND COMMUNICATION TECHNOLOGY IN SCHOOLS ON GENERIC SKILLS DEVELOPMENT: TEACHERS, PUPILS AND EMPLOYERS PERCEPTIONS.

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Declaration

I hereby declare that the candidate, Nwaozuzu Daisy is the author of the thesis presented herein; that, unless otherwise stated, all references cited have been consulted by the candidate; that the work of which the thesis is a record, has been done by the candidate, and that it has not been previously accepted for a higher degree.

Signature:

All conditions stated within the Ordinance and Regulations of the University of Dundee have been strictly adhered to and fulfilled by the candidate, Nwaozuzu Daisy.

Supervisors' Signatures:

Dedication:

This thesis is dedicated to my parents, Chief Sir Henry and Lady Comfort Mere, for their faith and belief in me, and for sponsoring my PhD program. May the good lord preserve you both to reap the reward of your love.

Abstract

This mixed method study sought to explore the perceptions of key stakeholders in education, on the role and contribution of ICT in Scottish secondary schools towards generic skills development among pupils for post school transitions. The timing of this study coincided with a period characterised by contextual pressures globally, marked with technology changes, youth unemployment and curriculum reviews. A review of literature was conducted systematically to evaluate the explicit permeation of ICT in Scottish schools. A sequential mixed method design was adopted for the two phased study commencing with a convenience sampling technique for the first phase, involving 1364 upper secondary school pupils from all eight schools, 64 teachers and the 17 employers in one local Council in Scotland. A purposive sampling technique was applied to select two sample schools for the second phase, based on best use and practices of ICT. Questionnaires were administered online and in person at the first phase, followed by a semi structured interview at the second phase. SPSS was used for descriptive statistics, correlation analysis and one way Anova, while Nvivo 10 software was used for thematic analysis from the interview transcript.

The study offers a framework for personalisation starting with identification of pupils' ability and ICT skill level at inception classes, followed by a personalised learning design incorporating pupils' interest, ability and post school destination. The study also proposes separate roles for teachers and policy makers in order to maintain teachers' autonomy, as policy makers' interference has been identified to have an impact on teachers' professionalism, effectiveness and confidence necessary for imparting generic skills in pupils.

A series of recommendations are provided for future research, including a longitudinal evaluation of generic skills acquired from individual school subjects through the upper school years to post school destination, to ascertain effective transfer and sustainability of generic skills.

CHAPTER ONE: INTRODUCTION

1.1 General Introduction

The pervasiveness of Information and Communication Technologies (ICT) in society has created opportunities for teachers and learners alike. These opportunities include increased access and flexibility to learning, enhanced learning experience and outcome, either in the form of specific subject knowledge or generic knowledge.

As technology becomes more ubiquitous, and more embedded in our culture, homes, schools, and work places, the need becomes more apparent for educators to equip pupils and young people in general with the relevant experience that prepares them for life beyond school, thus suggesting the need for a change in what we learn and how we learn (John and Wheeler, 2012). This infusion of various information and communication technologies at schools has made provision for generic skills an expected outcome globally from compulsory education. Consequently, this study focuses on the impact of the role of ICT in schools on generic skills development among secondary school pupils for post school transition.

The first chapter sets the scene of the study and introduces the research area of ICT and generic skills in schools from a global perspective, before narrowing it down to the Scottish context. This chapter highlights the purpose and context of the research with particular details of the rationale behind the study, the scope and the overall structure of the thesis.

1.2 Purpose of the research

The main purpose of this study is to explore the effectiveness of Information and Communication Technologies on generic skills development among pupils for post school transitions. It also aims to investigate the various ICTs in school to elicit which particular forms of ICT generate opportunities for generic skills development for pupils. This will then inform the teachers and school authorities to modify or change the delivery strategies, personalise skills in line with pupils' ability, aspiration and learning environment for a greater positive outcome of schooling. Furthermore, my study sets out to achieve some objectives which include exploring the perceptions of:

- Teachers on their use of ICT in preparing pupils for life beyond school
- Pupils on how their access and use of ICT in school is preparing them for their future aspiration, and
- Employers on the impact of compulsory education on pupils' acquisition of employability skills in preparation for the world of work.

1.3 Rationale for the study:

The following reasons are cited as justification for this study.

- The meetings of the Heads of States and Governments at Lisbon in 2000 recommended the use of ICT as a priority area in education and training in the EU States in a bid to achieve its vision to be the 'world's most competitive and dynamic knowledge driven economy' by 2010 (Kok, 2004). As a follow through, and to achieve this aim, most Member States of the Organisation for Economic

and Cooperation and Development (OECD) commenced policy reviews of their educational systems and in some cases, a change in curriculum, aimed at equipping young school leavers with 21st Century skills. Therefore, this timely study is a review of the integration of the Lisbon Agenda in a bid to ascertain the best place within the educational sector, for incorporating the 21st C skills.

- The 2002 debate on education in Scotland was a reaction to globalization and the quest for a knowledge society (Munn, Stead, McLeod, Brown, Cowie, McCluskey, and Scott, J. (2004). This debate led to a consultation period of eight years, followed by a change in curriculum - the Curriculum for excellence, but excluded the voice of the pupils who are among the active participants in the educational sector, especially as most government policy on education affects them directly. The current influx of ICTs in schools is aimed at having well rounded pupils with global competitive advantage, as the CfE reiterated in its four capacities - Successful learners, Confident individuals, responsible citizens, effective contributors- (Biesta and Priestley, 2013). Therefore the pupils' opinion on issues concerning their future is vital. Through the recommendations from the study, the researcher hopes to extend the pupils' voice on the decisions that affects their future aspiration.
- The CfE has been criticised among teachers in Scotland as lacking clarity in its directives to teachers and downgrading academic knowledge, (Priestley and Minty, 2012b) which challenges the teachers autonomy as well as their confidence to impart the necessary skills in pupils. In addition, the findings of the National Survey of Secondary School Teachers (2013) regarding the senior phase of the

CfE highlights significant concerns over resources, support and information, workload and assessment, which inevitably affects teachers confidence in the classroom. This study attempts to investigate these concerns further with a view to proffering useful recommendations on how teacher autonomy could be upheld.

- In the UK, with the economy moving towards recovery from recession, employers had been engaging young school leavers, in a bid to fill the increased vacancies since 2011 (12% rise) yet skills shortages still persist and most vacancies appear to be 'hard to fill' (Hurrell, 2015). In Scotland where there is an increase in skills gaps by 19% and skills mismatches (Shury, Spreadbury, James, and Tweddle, 2011), there appears to be an increased difficulty in finding employees with the right sets of generic skills. As a recognised strategy to hire school leavers in a bid to fill the skills gaps, a significant number (39%) of employers (Shury, Spreadbury, James, Tweddle, Jones, & Constable, 2014) has consistently reported that they are dissatisfied with the level and quality of generic skills possessed by young school leavers. Through this study, the perceptions of the employers were sought to assess the level of these issues and determine how best to bridge this gap.
- Substantial sector studies on generic skills had been carried out especially in the higher education, further education and in the work place but not in the secondary school sector. The lack of literature in the area of generic skills development in the secondary school sector indicates little or no research in this sector and obviously opens up a gap that needed to be filled, especially as generic skills have become more relevant to the labour force and knowledge economy of the 21st century.

Moreover, pupils post school transition to positive destinations will require a mix of discipline specific skills and generic skills to optimise any chosen destination in this century.

1.4 Background of the study

The European Union directive on education has made the use of ICT in education and training a top priority since the year 2000, thereby supporting its aim to become the 'most competitive and dynamic knowledge based economy in the world, capable of sustainable economic growth'(Kok, 2004, p. 6). As a follow through, and in reaction to the challenges posed by globalization and the knowledge-driven society, new policies in education were formulated at the EU level after a meeting of heads of governments. The outcome of this meeting popularly referred to as 'the Lisbon strategy' (Begg, 2008) recommended among other objectives for the education and training system to be reviewed in line with the industrial changes and globalization and the promotion of basic skills especially in the area of ICT. The outcome is illustrated in the diagram below

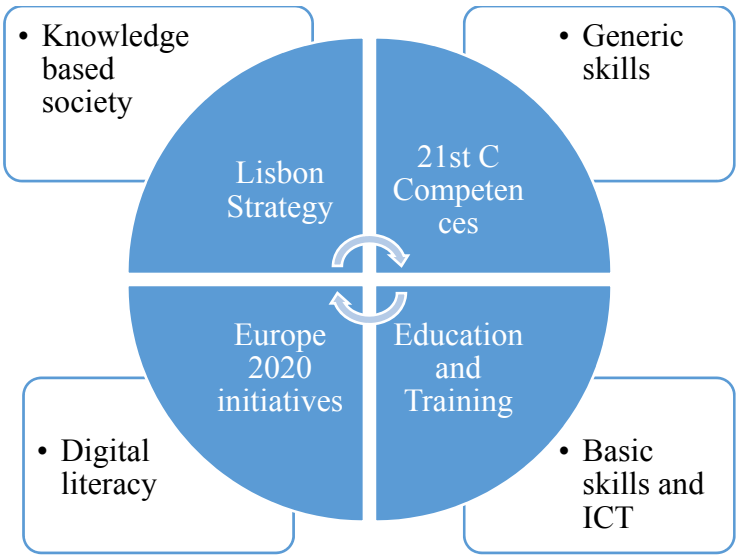

Figure1.1 The outcome of the European Union directives on education

Following the recommendation of the Lisbon Strategy, curriculums in some European Union member countries (Australia, New Zealand, Republic of Ireland, to mention but a few) were either reviewed or modified in line with the Lisbon recommendation to accommodate the 21st century skills. In England (2014), Wales (2008), and the Republic of Ireland (2008) have all witnessed curricular reviews. In Scotland, a new curriculum, the Curriculum for Excellence was launched and the implementation started in 2013 through to 2014. The consultation process started in 2002 with a national debate on education, which highlighted certain areas of improvement to education in general and the curriculum in particular.

This debate endorsed the need for improvement in the curriculum reform in secondary education in particular and specifically highlighted ICT as one of the skills and knowledge relevant for modern living. This need to broaden the range of learning experiences for young people as well as equipping them with core skills later led to the birth of a new

Scottish curriculum, the Curriculum for Excellence (CfE). The government policy document recorded and stressed the need for opportunities for young pupils to develop skills for learning, skills for life and skills for work with a continuous focus on literacy, numeracy, health and wellbeing (Education Scotland, 2008, Humes, 2013) especially in the upper secondary school. The CfE endorses, ICT as a key driver in modern learning and living and as such, permeates every subject. It has therefore become pertinent to examine critically the impact of the ICTs in school on pupils, ensuring that their use and what is learnt in schools on generic skills acquired will actually translate into effective performance at work and effective living in general.

From this stand point, it implies that CfE portrays education as having four purposes, with a major emphasis on developing individuals as 'successful learners, confident individuals, effective contributors and responsible citizens' (Scottish Government, 2004). This is illustrated in the diagram below.

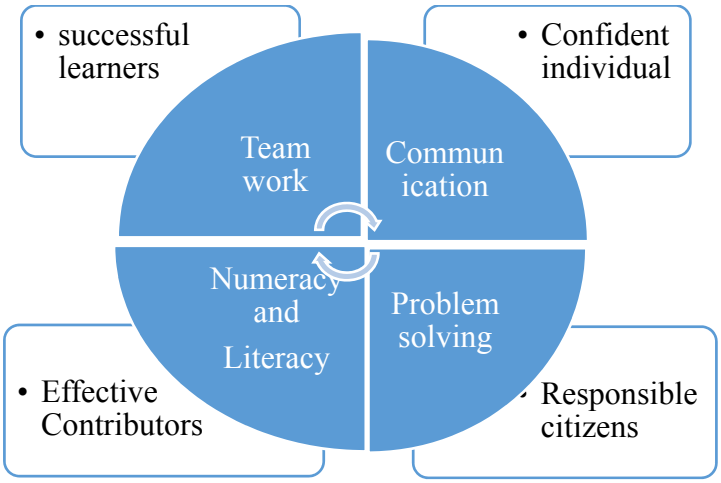

Figure 1. 2 The Curriculum for Excellence's Capacities

These four purposes apply to young people in school commencing from age 3 to 18yrs and into adulthood as life- long learners. As a 'priority area' (Scottish Government, 2004), broadening the range of learning experiences for young people and equipping them with core generic skills is paramount to achieving the aims of the CfE. Similarly, determining the skills and competences that young people would require for living and the workplace has become an area of concern due to globalization and its associated demands. Consequently, the concept of generic skills has re-emerged in the political and educational discourses as the demand for it has become very popular in the work environment.

A survey involving about 400 participating employers aimed at investigating their perceptions of the important workplace skills and competencies required for current and future employment highlighted basic skills to be of high importance. These skills included the thinking skills, personal quality skills, and interpersonal competencies (Richens and McClain, 2000). The result of this survey which was carried out a decade ago is not significantly different from the result of the recent surveys carried out by the UKCES in 2014, thus highlighting the crucial role of generic skills as a necessary tool for work place success. Within Scottish education, there is an expected emphasis on generic skill development as the present curriculum suggests. This is believed to be a positive and sustainable approach towards achieving the four capacities of the Curriculum for Excellence (CfE) (Scottish Government, 2004) in line with the nature of education in Scotland.

1.4.1 The nature and function of education

Education means different thing to different people and as such is manifested in many different forms and ways. Some of the ways of manifestation can be an experience with direct impact on the mind, character of an individual and even the physical being. In other words these experiences will have a direct influence on the culture of the people as well as on their economy. Adapting the words of John Dewey (1938), Education would mean a process of living through a continuous reconstruction of experiences. This suggests a dynamic nature of education and as such, bound to have issues around its nature and function. The nature and purposes of education are bound to change depending on the location -country, setting (classroom or virtual), discipline, focused and informal setting. The context in which education is being discussed would naturally shape the understanding of the meaning of education.

Education goes beyond formal classroom settings. Within the context of this study education means the co construction of knowledge using tools for mediation as highlighted by Vygotsky (1978) which are in the immediate environment of the pupils and which forms part of the pupils' culture. It involves collaboration and interaction for effective learning. These tools include ICT (computers), and also parents, teachers and fellow pupils involved in the social process of learning, as well as the interaction which has an impact on the individual learning. This style of education is not dissimilar to the kind obtainable in Scotland which has contributed to its unique system through its Curriculum for Excellence.

The Scottish Educational system:

Scottish educational system has been remarkably known to be a signifier of national identity in Scotland with continued public support for education (McPherson and Raab, 1988; McCrone, 1992; Paterson, 1994; Devine, 2000). This is a traditionally held perspectives of Scots due to the fact that it is socially open to all (Munn et al, 2004), allowing children from humble backgrounds to rise' (Patterson, 2004). Scottish education has a long history of universal public education (GTC, 2016), with emphasis across a range of subjects which has made it distinct from the rest of the UK. This distinctiveness is further evidenced in its own qualification framework which is separate and different from Wales and Northern Ireland, but with recognition accorded to each sector within the UK.

England and Wales follow the National Curriculum (with the exception of the foundation phase in Wales), Northern Ireland follow the Northern Ireland Curriculum whereas Scotland follows the Curriculum for Excellence (also known as the CfE) for nursery, primary and secondary education. The Curriculum for Excellence is a major educational reform aimed at providing a wider, more flexible range of courses and subjects. The flexibility experienced by Scottish schools is such that schools can make their own decisions on what to teach pupils without sticking to any rigid learning path while the Scottish government only sets guidelines about the school curriculum (Munn, stead, McLeod, Brown,Cowie, McCluskey, Pirrie and Scott, 2004). There are five defined levels within the Scottish educational system. These include early (pre-school years and P1), First (to the end of P4), Second (to the end of P7), Third and Fourth (S1 to S3), senior phase (S4 to S6, college, etc.) Each of this level is reached based on the teacher's assessment of a student's abilities and readiness to progress.

Children in Scotland complete seven years of primary school, starting in P1 (the equivalent of Year 1 classes in England), going up to P7 (the equivalent of Year 7 in England). After this, they do six years of secondary school from S1 to S6 (equivalent to Y8 to Y13 in England) as demonstrated in the diagram below.

Table 1. 1 Scottish Educational system compared to the rest of the UK

Age during school year	England and Wales: National Curriculum (plus Foundation Phase in Wales)	Northern Ireland: Northern Ireland Curriculum	Scotland: Curriculum for Excellence
4-5	Reception	Year 1	P1 (Early level)
5-6	Year 1	Year 2	P2 (First level)
6-7	Year 2	Year 3	P3 (First level)
7-8	Year 3	Year 4	P4 (First level)
8-9	Year 4	Year 5	P5 (Second level)
9-10	Year 5	Year 6	P6 (Second level)
10-11	Year 6	Year 7	P7 (Second level)
11-12	Year 7	Year 8	S1 (Third/Fourth level)
12-13	Year 8	Year 9	S2 (Third/Fourth level)
13-14	Year 9	Year 10	S3 (Third/Fourth level)
14-15	Year 10	Year 11	S4 (Senior phase)
15-16	Year 11	Year 12	S5 (Senior phase)
A-Levels and SCE Highers – not compulsory			
16-17	Year 12	Year 13	S6 (Senior phase)
17-18	Year 13	Year 14	

Currently, schools in Scotland are well attended with a pupil population of about 385,000 primary pupils and 285,000 secondary school pupils in Scottish schools (OECD, 2015). The school curriculum is divided into two, namely the broad general education (BGE) and the senior phase with a general curriculum emphasizing on literacy, numeracy and health and wellbeing as fundamental teaching across all levels.

The broad general education starts at early learning age of 3years through to end of secondary school (S3), with the purpose of developing knowledge, skills, attributes and capabilities. These are represented as the four capacities of the Curriculum for Excellence aimed at having successful learners, confident individuals, responsible citizens and effective contributors (Scottish Government, 2004). During the broad general education young people are expected to develop skills for life, learning and work with the curriculum specifically introducing life skills from secondary year 3. Although there are eight curriculum areas namely Expressive Arts, Languages and Literacies, Religious and Moral Education, Social studies, Mathematics and Numeracy, Sciences, Technologies and Health and Wellbeing, learned across the 6 year levels in secondary school, pupils have the opportunity to exit the secondary school from year 4, when they gain qualifications. Alternatively, they can also stay onto Year 5 and 6 when they can take a range of qualifications. The senior phase of 15-18 years old offers young pupils the opportunity to deepen their learning and knowledge of the broad general education by choosing subjects for specialization. It also enables them to develop the skills, knowledge and understanding that will be required in their post school transitions. Figure 1.3 shows a holistic picture of the Scottish compulsory education from a practical stand point.

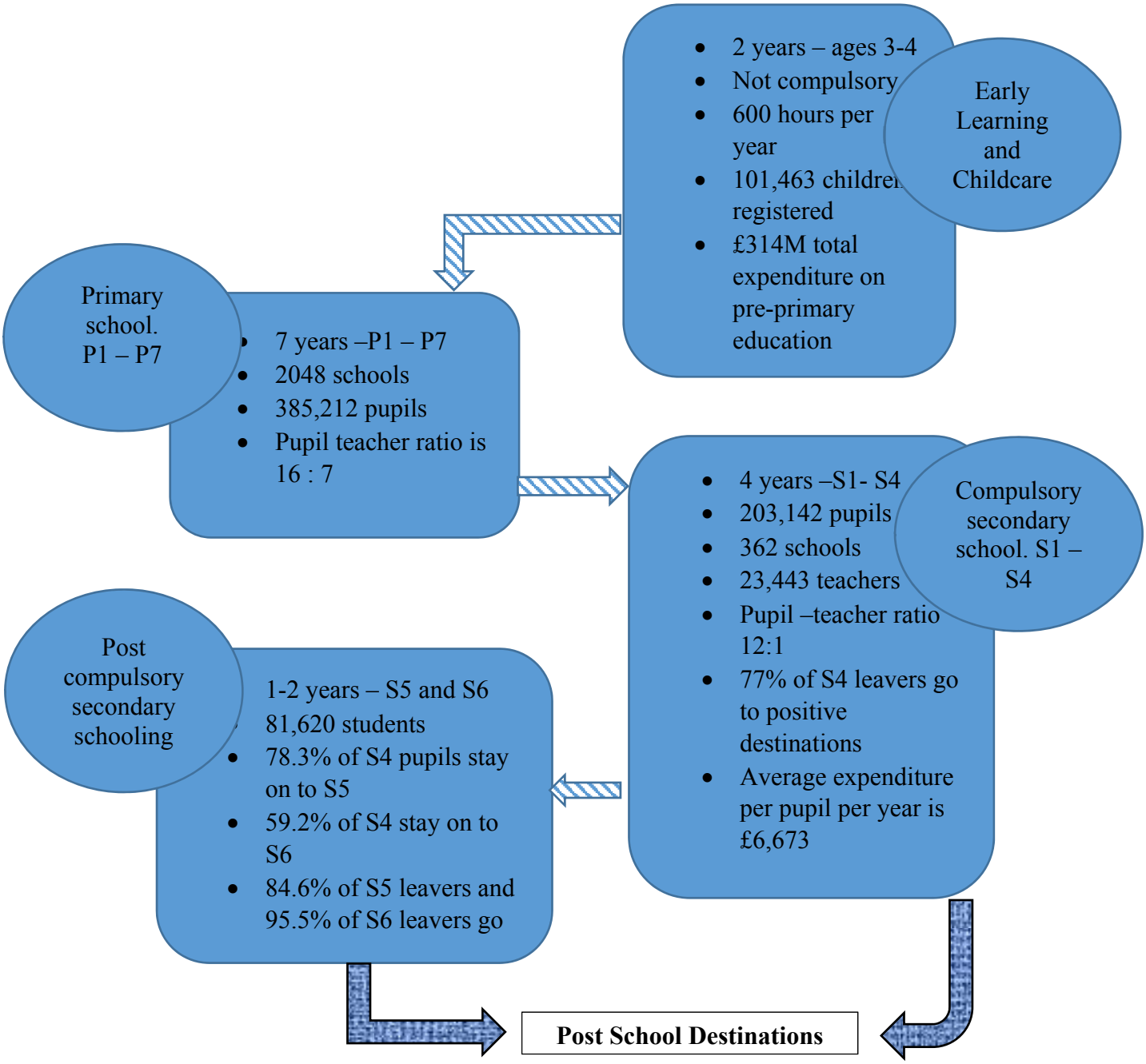

Figure 1. 3: Phases and stages in the Scottish school system

Source: Scottish Government (2015), *OECD-Scotland Education Policy Review: Country Background Report*, Scottish Government

1.4.2 The Conceptualisation of Generic skills

Generic skills are conceptualised as being skills applicable to different situations after the foundational teaching / learning, and which can be applied to meet the varying needs of new situations. Therefore, generic skills are regarded as the means of overcoming the problems of present and future skills gaps, in the face of continuing technological and social change, increasing bodies of knowledge and increasing international competition (Cornford, 2005). Thus, generic skills are expected to meet the needs and challenges that arise at different times in the work place as social and technological changes occur and contexts change (Young, 2010, Bowman, 2010). The clear intention for introducing generic skills in the school curriculum is that knowledge and skills resulting from the initial learning foundation will reflect in non-formal learning settings and particularly in the work place thereby resulting in greater efficiency through more effective use of knowledge and skills. Consequently, generic skills are envisaged as a convenient way of achieving the desired higher levels of productivity and national competitiveness. The more costly alternative would be to contemplate specific, continuing education with every change in technology and work processes. Therefore, the development of generic skills entails the transfer of learning through the process of adaptation and application of existing knowledge and skills to new and different contexts. As knowledge base expands at an ever accelerating rate, coupled with the evolution of the labour market (which in itself is a challenge and a formidable task for education to meet its associated demands), it becomes pertinent for curriculum content to be constantly be updated in line with demands of the 21st century. These concerns will be explored through the research questions guiding this study.

1.4.3 Research questions

This study has been guided by three research question which are hereby stated as follows:

- What are teachers' perceptions of the explicit use of ICT in teaching towards generic skills development among pupils?
- What are pupils' perceptions of their ICT use in schools towards generic skills development for post school transitions?
- Do employers see a 'fit' between the acquired generic skills from school and employability skills?

1.5 Research Context

Skills shortages have been persistently reported to be on the rise in the UK and in Scotland in particular, amidst efforts of the government towards curbing the unemployment rate, including engagement of young school leavers either through apprenticeship or direct work placement from school. In addition, Schools in Scotland have witnessed an increase in the supply of information and communication technology in a bid to equip pupils with 21st Century skills aimed at curbing youth unemployment in the long run. The Scottish Government has specifically, through the CfE, introduced the teaching of life skills from upper secondary school years (S3-S6) in order to prepare pupils for life beyond school. Similarly, teachers had the directive to use ICT explicitly in the delivery of their teaching and administrative duties, so as to encourage and develop a skilled workforce.

However, these positive ideas from the government have created tension amidst the current challenges already faced at school by teachers, including the associated challenges

of the new curriculum (CfE). Within this context, the problems that arise concern the practicalities of the new curriculum on developing generic skills from the use of the ICTs in school for a more positive destination for pupils. Therefore, the current study examines the impact of the Scottish curriculum on generic skills development among school pupils in one local Council by exploring the perceptions of teachers, pupils and employers.

1.6 The Scope of the study

This study seeks to identify the most effective way to develop generic skills among pupils from their experience and use of ICTs in school, to enable them make more positive and sustainable destinations after secondary school education. Development of generic skills and its transferability will make young people's school experience a determining factor in their future aspiration. On the other hand, it aims to equip pupils with working skills as a strategy towards reducing the 'employment gap' (Bowman, Borlagdan, and Bond 2015) and the skills mismatch issues that has been recurrent in Scotland as well as other countries around the globe. A comprehensive and integrated method through varied and deeper understanding of skills development was employed using mixed method approach as a more effective means of sharing the experiences of teachers, pupils and the employers who employ young school leavers.

1.7. Core terms used in the study

Some variations of terminologies are used interchangeably throughout this study to help with understanding of the key concepts of this study and to also serve as explanation of the research topic. Such terms which has been contextualised to this study, have been explained below and will serve as a guide throughout the study

- **Globalization:**

In the last two decade and more recently, educational context are no longer confined to bounded spaces. Education has been inflected and as such learning has been effectively taking place at different location and times. The 'Anywhere, Anytime' philosophy has been made a reality with the help of information and communication technologies which have even become more ubiquitous. Although this ideology exceeds national borders, with cross border convergence and integration and with students' continuous quest for knowledge, either physically or virtually, it however, goes beyond the Vygotsky's theory of knowledge through 'genetic' social relations and situated learning.

The Vygotsky's ideology of a nested social relationship where by the use of mediating artefacts are part of the cultural environment helps in the understanding of globalization in education. Vygotsky acknowledges that these artefacts change consistently in line with the cultural development in the society. The implication is that as the society transforms from the industrial stages to a more service oriented phase, there will be changes in the artefacts in use and by extension changes in human behaviours and development.

According to Rizvi and Lingard (2010) Globalization can be explained through three perspectives

namely, an empirical explanation of the shifts around, an ideology that encompasses several political interest, a way of identifying people socially and finally an identity of people shaped by their aspiration and expectations (Rizvi and Lingard, 2010). Globalization in this regard has both a descriptive and normative qualities. The descriptive attributes of globalization highlights the increasing connectedness of the world, made possible due to the 'mediational artefacts' (Vygotsky, 1981) in the form of computers,

smart phones, social media, or internet for communication (Marginson, 2010a). Conversely, the normative qualities, encompasses the current borderless territories associated with globalization, have effectively opened up access to knowledge through, commercialization and standardization of education with open access at an unprecedented scale. From a sociocultural lens, one could deduce that through the internet and other information and communication devices, a world library is feasible, transfer of data and messages are possible, open source knowledge are encouraged and most importantly the imaginary cultural space is realized (Marginson, 2011a).

- **Post school transition**

Post school transition is an expectation of an educational transition which involves the movement of pupils from one educational context or set of inter personal relationship to another (Jindal-Snape, 2013). According to McGinty and Fish (1992, p. 6), the post-school transition is: '… a phase or period of time between the teens and twenties which is broken up educationally and administratively'. During the phase, there are changes of responsibility from child to adult services, from school to further and higher education, and from childhood dependence to adult responsibility. It is a process by which the individual grows through adolescence to adulthood and achieves the balanced state of dependence and independence which a particular community expects of its adult members'.

In Scotland, as pupils come to the end of the compulsory education which usually starts from the entry level (primary 1) and ends in the senior phase (secondary 6), they are faced with choices of different destinations beyond schools. These destinations are either the university (higher education), college (further education), work (employment), or living

at home. A successful transition process is based on the pupil's strengths, abilities, skills, preferences and interests, and requires collaboration between the school, further and higher education providers, family and employers. This alludes to a reconceptualization of transition as an ongoing activity, with 'changes in context and interpersonal relationships' (Jindal-Snape, 2010) and as such requiring support. In Scotland, it is a shared vision between both politicians, government and schools to ensure that there is an increased and sustained positive destination. As part of government strategy for sustained positive destination, the CfE offers learning that promotes both academic and vocational qualification and also links the educational system to the industries (Scottish Government, 2015)

In this study, post school transition refers to the time when the secondary school education ends and the preparation or readiness to go into further education, higher education, employment or living (including gap year) starts.

- **Pupils**

Due to the cross cultural differences in the countries explored in this study, different terms have been used interchangeably to refer to the term 'pupil' without a difference in meaning. Terms such as 'students', 'young people' and children, were frequently used interchangeably, although with the same meaning as pupil, which generally means, a person who is taught by another, especially in a school. Nisbert (2014), defines 'pupil' as a person of any age who is receiving school education or is entitled to do so either at a public school (managed by a local authority) or an independent school (privately managed). This definition shares a common meaning with the definition of 'child' and 'young person' whose definition is underpinned by the UN convention for the right of the child. While the UNCRC defines the child as any individual at the age of 0-18yrs (Office

of the high commissioner for human rights, 1989), the National children's bureau specifically makes a distinction for the young person as individuals aged from 16 to 18 years (NCB, 1989) but however adopts the term 'children and young person' (CYP) to represent individuals that are aged 0-18 years.

Historically, the concept of child have been viewed from the perspective of survival and endurance (Demuse, 1995 and Aries, 1962), protection and prevention from disease, labour and poverty (Arieh, 2010), rather than from an identity perspective as individuals with own rights. This is primarily because of their dependence on the adult for their provision, which in turn has influenced the adults understanding of the child and childhood. Childhood is socially construed and experienced differently by different children, depending on their gender, social class, and ethnic belongings which collectively has impact on childhood (McLeeod, 2008). Over time, the legal status, age, and maturity of the child became an associated identity. From this perspective and with the 1959 declaration rights of the child, more recognition was accorded to the child as an individual possessing a legal right (Gal, 2006) and promotion of children's wellbeing. From this stand point the UN convention on the right of the child in 1989 came to being with a set of comprehensive rights for the child and international laws binding most countries on the recognition and compliance of children's right. Presently, the culturally diverse nature of children's environment, coupled with the high technological dependence of the industrial age has placed the child with more responsibility and into work early. This, projects the child as an active 'social actor in a changed social and cultural context' (Kellett, 2010, p. 15) as against an earlier held notion and identity of the child by adults as passive receptors (Zwozdiak-Myers, 2007, Mcleod, 2008).

The predominant identifying characteristic of the child within the UK, is the age range of 0-18, and this age group are usually in compulsory education in UK and do not differ much in meaning from the term pupil which is a widely accepted term used in addressing school children in Scotland. This definition captures the meaning of the term 'pupil' as used in this study. However, the term itself is used differently in other countries to refer only to a person from pre-school through to primary school, while the term 'student' is preferably used instead to refer to a person in the secondary school, colleges and university.

- **Curriculum for Excellence (CfE)**

The Curriculum for Excellence is Scotland's own national curriculum for compulsory education in publicly funded schools in Scotland. It is believed by the CfE's architects that it is Scotland's reaction to globalization and as such, is designed to fit the modern world. The CfE started its official beginning in 2002 after a very popular debate in 2002on education in Scotland which attracted over 15000 stakeholders in education. Up until its foreseen completion in 2016, with senior qualification in place within Scottish schools, the CfE has been implemented through consensual approach rather than through legislation (OECD, 2015) and as such has also been developmental with varying implementation times between schools (The Guardian, 2012). The CfE offers a responsive and flexible learning system which is pupil centred, from the ages of 3 through to 18 with personalisation and choice in order to meet the needs of all children and young people (The Scottish Government, 2012c). It seeks to develop coherent 3-18 curriculum which emphasises on capacity and learning rather than school subject. Within the CfE, there is emphasis on its four capacities, - to enable young pupils to become successful learners,

confident individuals, responsible citizens and effective contributors (The Scottish Government, 2013a). It hopes to achieve these through the improvement of young peoples' achievement, attainment and life chances through Scottish education.

- **Diagnostic Testing:**

This is a teaching strategy for evaluating the knowledge base and skills which a teacher uses to ascertain and diagnose the strength and areas of need of a students. This procedure usually commences with the gathering of careful evaluation of detailed data using students' knowledge and skills in a given learning area' (Department of education, 2013)

1.7.1. Contested definitions

- **Information and Communication Technology**

The term 'Information and Communication Technology' widely referred to as ICT is not a new concept in the academic discourse as it connotes different meanings to different persons, depending on the setting and context. While to some scholars, it refers to a means of 'interaction and communication' with the rest of the world (Silverstone 2007), a 'continuum of skills and abilities' (Zuppo, 2012) to others it is perceived from a cultural perspective as it shows 'what' the device can do and 'why' and 'how' it can do it (Birkland, 2013). As a result, a universal definition appears to be a challenge (Zuppo, 2012) due to its dual or multiple identities as the different applications of ICTs exists in different context. For instance, in the business or economic setting, ICT is synonymous with productivity and enabled communication, whereas in the educational setting; it encompasses not only the equipment, but also refers to a group of skills and competencies that the learner (Pupils) and the teachers acquire from their exposure to the various ICTs or equipment (Zuppo, 2012).

For the purposes of this study, the primary definition of ICT will revolve around the devices and infrastructures that facilitate the transfer of information through digital means, and are engaged in learning and teaching activities. This definition captures the meaning of ICT in schools from the CfE and the sociocultural perspective. Within the sociocultural perspective, ICT could be referred to as 'technical tools' (Vygotsky 1978) that help to develop authentic activities which increases pupil's learning and the co construction of knowledge.

In a broad sense, it includes PCs, desktop computers, laptops, handheld devices, and other types of wireless devices that allow the gathering, exchange, retrieval, processing, analysis and transmission of information (van Deursen, Courtois, and van Dijk, 2014). It also accommodates any tool that facilitates the communication process, transmits information and shares knowledge through electronic means.

- **Generic Skills**

A precise definition of generic skills is difficult because of differences in content of different skills and skills grouping. As a result, there is considerable divergence in opinions on a working definition. Similarly, there is no international agreement on either the conceptual basis for or the identification of generic skills. Therefore, there is no definitive model or prescription on how they should best be learned or assessed (Forfás, 2006). However, there is enough general consensuses on the changing nature of the workplace and the skills now required for effective working in all sectors, driven in particular by constantly changing technology and its application. These developments have increased the need for sustained economic growth of a labour force equipped with a

set of skills that are generic, in the sense of being transferable and essential for employability i.e. transferable and employability skills (Bowman, 2010, Oliver, Herrington, and McLoughlin, 2010).

It could then be argued that generic skills have the following characteristics: are part of a suite of skills which, in combination, optimise an individual's productivity; underpins technical skills; draws on personal attributes which affect how effectively skills can be learnt; is independent of sector or occupational grouping; relates to work processes and the way in which a task is carried out; are required by workers, albeit the extent to which this is so, may vary; contributes to an individual's overall employability; enhances the capacity to learn, adapt, think independently, and cope with technological advancements and brings added value to other more job specific skills.

Generic skills as a term has often times raised an issue of ambiguity and clarity as it has often times, flagged up confusion in the literature (Male, 2010) due to the various terms that are interchangeably used in different countries and in different contest. Some of these terms range from 'core skills (Scotland)' 'key skills' (England), 'key competencies' (Australia), 'necessary skills' (USA) and 'essential skills' (New Zealand). Other terms associated with generic skills are soft skills, common skills, employability skills, basic skills, and transferable skills. For the purposes of this thesis, and for consistency, the term 'generic skills' will be maintained throughout.

- **Twenty First Century Skills**

Twenty-first century skills are relatively new in the skills discourse but have consistently been flagged up in the discussions on knowledge and skills for the workplace, especially as taught in schools and also in comparison to the expectations of employers (Partnership 21st C, 2008). There is a significant but consistent mismatch between what is taught in school and what is expected in the workplace thereby making young people poorly prepared for work and often times resulting to employers dissatisfaction (Felstead and Green, 2008; Winterbotham, 2014) This outcome has led to empirical studies investigating the world of work in the 21st century and the required skills (Pellegrino, and Hilton, 2013, Achieve, 2005), even though, most of these investigations had been more on university graduates than young school leavers in general, and yet, young school leavers are actively involved in employment in present times.

Twenty first century skills refer to those high-priority skills, competencies and types of understanding that individuals need, to be productive, creative workers and citizens (Bowman, 2010). These includes, problem solving and critical thinking, collaboration and communication, innovation, creativity and teamwork (Partnership for 21st century skills, 2009) and can be developed from authentic activities involving the use of ICT that are already embedded in the physical or cultural settings (of home or school). Vygotsky's sociocultural theory highlights the importance of active learning and co construction of knowledge among pupils. Through the use of authentic activities in the immediate environment, which can come through engagement with ICT, pupils engage with their zone of proximal development to acquire skills that are relevant for participation in the society and most importantly transferable to the larger society (Miller, 2011). From a

sociocultural stand point, these skills are dependent on the pupils' zone of proximal development (ZPD) (Vygotsky. 1978). The ZPD is the difference or distance between what the pupil can do for himself unaided and that which he requires help or assistance to complete. This includes the difference between the level of actual (which is determined by independent problem solving) and potential or higher development (as determined by collaboration with others) (Vygotsky, 1978). This introduces the theory of the 'more knowledgeable others' (MKO) as proposed by Vygotsky (1978). The importance of the 'more knowledgeable other' which emphasises on pupils' potentials and that of 'others' around them helps in developing the 21st century skills. These 'others' can either be the peers, teachers or tools (ICT), in collaboration and directly related to 21st century skills. By this definition, it suggests that these skills are required by all individuals, although the general perception has been irreconcilable.

- **Destination:**

In Scotland, it is a recognised and acceptable strategy to have pupils in secondary education leave from secondary four (S4) or any school year within the senior phase (S4 – S6) after attaining a formal qualification. These early leavers often times end up in positive destinations of either higher education, further education, training, voluntary work, employment or activity agreements (Scottish Government, 2017). From this stand point, and in this context, destination can be defined as a term used to describe the movement of leavers from compulsory education, at the completion of their school years. Usually, the information on destination is collected on self-reporting basis by the school leavers, through the administrative data of the school or the local government authority. In Scotland, there is a shared dataset, managed by Skills Development (SDS) which provides information on such destination. The latest dataset confirms that 93.3% of

2015/16 senior phase school leavers were in positive destination which was an improvement from the previous year's (2014/15) 93.0%. In Council A, the same improvement was realised across the first three popular destination route, namely higher education, further education and employment.

1.8. Thesis Structure

This thesis consists of six chapters as described below.

Chapter one provides an introduction to the study and background details. The significance of the study, the research aims and objectives, research questions, and structures are also presented. Chapter Two presents an overview of the study framework, and a review of literature conducted systematically as well as an analysis of the literatures. Chapter three presents the research design of the study, methodology, methods of collecting data, and data analysis techniques while chapter four reflects the results of the study. Chapter Five provides a detailed discussion of the research findings in relation to the literature and explores the limitations of the study while Chapter Six discusses the implication of the study findings for policy making and practice, and also highlights the implication for future studies (see Figure 1.4 below).

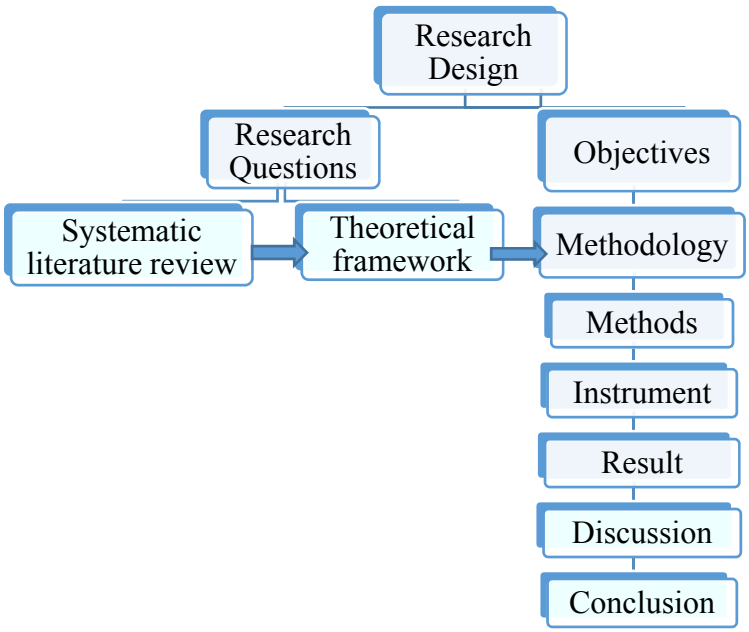

Figure 1. 4 Framework for the study

1.9 Chapter summary

This chapter has provided a brief explanation of the current study by highlighting the background and rationale behind the study as part of the justification for carrying out this study at this time. It has established a linkage of generic skills development, a popular subject and issue in the current global debates of the knowledge society, to the pervasiveness of information and communication technology, a permanent feature of the 21st Century and how best to live and operate effectively in it.

The next chapter (chapter 2) will review the identified literatures in the broad general area of ICTs and generic skills in schools, highlighting the global perspectives on generic skills that led to its conceptualizations. It will also address the policy impact on some specific OECD countries and thereafter followed by a systematic analysis of previous studies conducted around the research area.

CHAPTER TWO: LITERATURE REVIEW

2.1. Introduction

This chapter explores the background into the development of the study's conceptual framework. It sets the scene with the global perspectives on generic skills especially within the Organization for Economic Cooperation and Development (OECD) countries, where the OECD has influenced policy makers on the need to be sensitive to their countries position in comparison to other countries, either through international studies (OECD, 2007), or through harmonization in skills strategy. This movement has resulted in the emphasis on the development of relevant skills, activation of skills supply and effective use of skills (OECD, 2012), as a means to improved globalized economies. At the EU level, generic skills discourse has become more prominent in recent discussions and debates as a skill necessary for the 21st century living, due to the pervasiveness of information and communication technology. This came as an aftermath of the EU's Heads of States meeting in Lisbon popularly referred to as 'the Lisbon Strategy', (Jo, 2009) with the aim of making the EU "the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth" (Ivan-Ungureanu and Marcu, 2006). In this meeting, the importance of ICT was highlighted as a means to achieving the vision of the Lisbon strategy. This in turn, has influenced the review and curriculum changes world-wide which have placed emphasis on generic skills development from the use of ICT as a skill necessary for 21st Century living.

As educational policies move towards the acquisition of these 21st Century skills and lifelong learning in reaction to the challenges and complex demands of globalization and modernization (Finegold and Notabartolo, 2010), the need to emphasize on generic skills rather than knowledge, becomes more apparent and in high demand. This is due to the shift from lower skilled manual jobs to the service oriented knowledge based jobs. This chapter provides a general overview of the conceptualization of generic skills in four specific OECD countries where a substantial level of work has been carried out in developing national frameworks in an attempt to measure the importance and impact of generic skills and competencies. Some of these countries have had regular skills surveys and as a consequence had recently revised school curriculums. This chapter also presents a systematic review of studies on ICT in Schools published between 2004 till 2016 and also a review of studies on generic skills development in schools, covering the same period.

2.2 The Conceptualization of generic skills in OECD countries.

This section provides a global perspective on government educational policy changes in some OECD countries and its influence on the conceptualisation of generic skills. An overview of the policy influence of four English speaking countries, whose curriculum changes occurred between 2004 and 2015, and also met the inclusion criteria for the literature search of this study, are presented below. These selected countries, out of the other 35 member countries of the OECD, have cited ‘globalization and the knowledge based society’(Halsey, Murfield, Harland, and Lord, 2006; Lord and Jones, 2006) as justification for the rise in the demand of generic skills development in their respective

countries, in addition to the ongoing reviews in their educational policy and the curriculum. These countries include Australia, New Zealand, Ireland and United Kingdom (England and Scotland).

Australia:

Generic skills in the Australian educational and work sector is not a new discourse as it dates back to the Kermel Committee Report of 1985 which had the task to review the preparedness of Australian pupils for the international labour market through the educational system. This committee recommended the teaching of common skills such as team work, communication, and information management (NCVER, 2003). According to Young and Chapman, 2010, the Australian Education Council Review Committee (Finn, 1991) , which was a preceding committee had similar views on the skills framework but in addition, recommended more focus on generic skills than the subject specific technical skills. These early committees were later succeeded by the Mayer Committee (1992) which recommended a set of seven essential competencies for the work force, that later led to the contextualisation of generic skills by many industries in Australia (Allen Consulting Group, 2006) as it became included in their training packages of various other industries in the employment sector.

Over time, the Australian Chamber of Commerce and Industry and the Business Council of Australia (ACCI/BCA) reviewed the existing competencies by involving individuals from various industries in order to arrive at a Competency Framework that included some personal attributes together with industry based generic skills which were considered more essential for workplace success (NCVER, 2003). The frameworks included: Effective communication, team work skills, problem solving, planning and organising, self-

management, Learning skills initiative and enterprise and Technology skills. However, the flexibility required in the recent labour market and evolving economy was found lacking within the framework, which resulted to more industry led generic skills conceptualisation in line with global competitiveness.

The recent curriculum change in the Australian educational system which marked the first time of having a national curriculum came after several years of complex debates on what should constitute young people's learning in the fast changing environment of this 21st Century (Priestley and Minty, 2012a). Prior to this time, as recorded by Lingard (2010), there was devolution of educational powers which led to different curriculum policies at the State levels and territories (Lingard, 2010) and was unique to the schools at these state levels and territories. This old system encouraged the indigenous style of education but lacked a unified goal for a competitive Australia at the international level. In summary, the requirements of the knowledge society of the 21st century has necessitated the need for the development of generic skills focused on three distinctive dimensions.

Firstly, a discipline based learning area which includes the traditional subjects, constituting what the pupils are expected to know. Secondly, the general capabilities which includes the skills and attributes (ICT skills) relevant to young people that are growing up in the knowledge and information rich society and thirdly, the cross curriculum priorities which includes 'histories and cultures, sustainability, Asia and Australia engagement' etc (Ministry of education, 2014). This implies an increase in the demand for certain generic skills associated with the evolving society, and the need for individuals to adapt to the advanced social and technological changes in the society

(ACRA, 2013). It is therefore expected that conceptualization of generic skills will centre on these perspectives. This suggests that generic skills are not restricted to any particular educational sector or work and as such its development is the responsibility of the three sectors of education in Australia –the Universities, the Vocational Education and Training (VET) Centres and the school. However, the vocational education and training sector and the universities are making significant efforts towards to generic skills than the school sector.

In the VET Centres, generic skills are linked more to work skills, with considerable attention given to it due to the industry influence, which in turn has influenced its conceptualization, excluding literacy and numeracy skills. Similarly, the universities' models of generic skills conceptualization are also diverse and in line with their individual educational goals and curriculum whereas at the school level, the expression is very minimal even though, in the Australian context, a range of generic skills were considered of high priority across the curriculum, particularly, the thinking skills (enquiry and reflective thinking) problem solving skills and the interpersonal skills. However, their acquisition is arguably from the perspective of a contextualised learning for particular qualifications which is either achieved through either of the three sectors (the Universities, the Vocational Education and Training or through school). Furthermore, the issue of the best sector for introduction and acquisition of generic skills remains a contestable one, just as the mode of acquisition - whether it would be taught either as a stand-alone learning outcome in class or embedded generally in the learning.

In summary therefore, there are three concepts identified in the literature that are interchangeably used to refer to generic skills in Australia namely, key competencies and

general capabilities used in schools, employability skills used in Vocational education and training (VET) and lastly, graduate attributes and capabilities used in the higher education sector. These terminologies, regardless of which has been chosen in any of the different sectors, have the same meaning, although there are many definitive set of generic skills in the Australian educational sector with some sectors having a more limited set of generic skills than the others.

New Zealand:

Generic skills development in New Zealand is an important subject at the present time, just as in most countries, and is being driven by globalization and the demands of the knowledge society, just like Australia and some other OECD countries. New Zealand has witnessed a recent curriculum change which has been necessitated by the rapid global change in the society and the knowledge economy, with a view 'to promote a set of common values and subjects more relevant to today's world' (Bowman, 2010). The demonstration in the change in nomenclature from 'essential skills' of the previous curriculum to key competencies' of the current curriculum clarifies the composition of the new curriculum and the expected outcomes for schooling. While the 'essential skills' of the previous curriculum were integrated across all essential learning areas of the curriculum (Ministry of Education, 2007), the key competences of the present curriculum are enshrined in the curriculum. These competences are five in number and includes, thinking, using language, symbols and texts, managing self, relating to others, participating and contributing. The outstanding difference then, lies in the act of 'students wanting to use the competencies and recognizing how and when to do so appropriately (Priestley and Minty, 2012b) unlike the previous curriculum.

Ireland:

In Ireland there is a distinction of skills for the primary and lower secondary education. In primary education the generic skills emphasised are the ability to question, analyse, investigate, think critically, and solve problems whereas the lower secondary education emphasis is on effective interaction, communication, literacy, numeracy, manipulative skills, information technology, thinking and learning, problem solving, and social skills.

United Kingdom – England

Generic skills in education and training has continued to be a popular debates in the educational and work sector in the UK, thereby making it an important subject which often times has been defined, from the stand point of attributes, attitudes and behaviours (SQA, 2008). The impact of globalization and government policies on education and training in the UK seems to be driving generic skills development in the educational institutions in the UK, which has impacted on the different changes in the curriculum. The National Curriculum for England which was introduced in 1988 by the Education Reform Act, had since then had changes to the national curriculum in a bid to accommodate basic generic skills' so that pupils can leave school with the knowledge and skills they need to succeed in the real world. These latest changes in the national curriculum occurred in 2015.

The secondary education was the successor of the national curriculum, introduced in 1992 and is also applicable to Wales and Northern Ireland with a few exceptions, such as the teaching of Welsh and Irish languages in Welsh- speaking and Irish- speaking schools. However, the curriculum in England is unique and different from the curriculum of Scotland and Wales, and as such has different qualification frameworks. While the English

Curriculum Framework is accompanied by a set of outcomes that indicates the skills, attributes and behaviours of the learners, skills and attributes are enshrined in the four capacities of the Scottish curriculum that directs learning. The English curriculum recommends a combination of the functional skills, skills that are related to learning in a subject - the core elements of English, Mathematics and ICT and the personal learning thinking skills (PLTS) as essential skills for learning, life and employment. By implication, it means that the essential skills for life, learning and employment includes a combination of the functional skills and personal skills.

The aim of the Scottish secondary curriculum is to develop a coherent 12-18 curriculum that builds on young people's experiences in the primary phase and helps all young people to become successful learners, confident individuals and responsible citizens. The general statutory requirements that are applicable across the secondary curriculum are: inclusion of all learners, use of language, use of ICT, safety, health and wellbeing. The secondary curriculum includes the basic framework for the introduction of key skills, which are generic in nature and includes the following - communication, numeracy, information technology, working with others and problem- solving. However, there are other generic skills that are also becoming increasingly 'key' skills- e.g. customer service skills and modern language (Authority, 2003). In England as well as in Wales 'key skills' are regarded as key competences and are defined as "generic skills which individuals need in order to be effective members of a flexible, adaptable and competitive workforce and for lifelong learning" (The Scottish Qualifications Authority, 2003, p.16). Conversely, Scotland refers to these key competencies as 'core skills' and defines core skills as "broad transferable skills that people need to be full, active and responsible members of society"

(The SQA, 2003, p.16). Whether ‘key’ or ‘core’ skills, their meaning remains the same and reiterates the importance of generic skills at this present time of technological advancement.

In conclusion, from the countries cited above, there is one outstanding common feature - an agreement among the four countries that generic skills are important skills that have to be acquired through an educational process. There are some similarities and consistency among the countries. While Australia has seven strands of generic skills or ‘key competencies’ as it is called in Australia, New Zealand has eight ‘essential skills’ considered as important outcome for schooling, the United Kingdom has six key areas that the government and industries are in agreement as essential for successful lifelong learning, and Ireland has the same. In all of these countries cited above, the contrasting difference lies in the nomenclature and not the meaning or framework of skills, while the actual meaning of what constitutes a generic skills remains similar. However, there are varying opinions on the educational routes and dimensions for acquisition and inclusion and also whether it should be stand-alone subjects or embedded across the curriculum.

The next section will look at selected literatures for review

2.3 Systematic Literature review: justification for adoption

Different authors (Boland, Cherry, and Dickson, 2013; Hart, 1998; Paudel, 2013; Punch, 2013) have suggested approaching a literature review in different ways such as the systematic review approach due to the differences between literature review and the systematic literature review. Hart defines literature review as "the selection of available documents (both published and unpublished) on the topic which contains information, ideas, data, and evidence written from a particular standpoint to fulfil certain aims or to express certain views on the nature of the topic and how it is to be investigated and the effective investigation of these documents in relation to the research being proposed" (Hart, 1998, p.13). Petticrew and Roberts (2008) defines the systematic review as 'a review that involves a detailed and comprehensive plan and search strategy, aimed at reducing bias by identifying, appraising, and synthesizing all relevant studies on a particular topic.

This perspective supports the definition from Boland, et. al. (2013) and Paudel (2013). In their view, the systematic review is a high level overview of primary research on a particular research question which seeks to appraise high quality research to get an informed answer to the research question (Boland et. al. 2013; Paudel, 2013). This set of definitions of systematic literature review are different from the normal literature review or the traditional narrative which are mainly descriptive and do not involve a systematic search. While both systematic and literature (narrative) review remains rich in information, their unique difference lies in their search strategy. The former makes use of peer reviewed literatures, involving a detailed search strategy aimed at reducing bias,

whereas the latter is purely descriptive and often focuses on a sub set of studies in a chosen field (Boland et al., 2013). In the UK, there is an increased interest in conducting educational researches (both policy and practice) through a systematic reviews of available evidence for transparency, thoroughness and generalisability (Davies, 2000).

A recommendation by the Evidence for Policy and Practice information and Coordinating Centre (2007) recommended that studies should adapt to a systematic review style because of its comprehensive search strategy with the following objectives. Firstly, to develop a conceptualization of the subject area of generic skills and drawing a connecting thread to the ICTs in school. Secondly, to review and discuss the major issues and debates around the research topic – generic skills development and acquisition from the use of ICT, and thirdly to use the outcomes of this review to justify the choice of research topic, research questions, and approaches. A preliminary search on the broader research area displayed the key issues in the literature regarding clarity in government policy on ICT in schools (Priestley, 2012, EIS, 2013) and the non-popularity of generic skills in secondary school. There are also identified gaps in content and methodology from studies reporting on the role of ICT in schools that challenges the acquisition of 21st century skills.

While most studies on ICT in school has examined in some details the impact of one form of ICT on teaching and learning, very few have specifically looked at how the individual needs of the pupil could be realised through the various ICTs in schools (Voogt, Knezek, Cox, Knezek, and Ten Brummelhuis, 2013). Few studies have also considered how the 'acquired ICT literacy' from school (Anderson 2008) could be utilised at transition points, beyond compulsory education. For instance, linking the ICT skills acquired from

secondary schools to the skills requirements at further and higher education, employability skills to work or the interpersonal skills for living. This lack of alignment of ICT in addressing these individual needs of the pupil is linked to the gap in aligning ICT use in schools with 21st century learning and living challenges. This alignment, which is an important aim of schooling, is particularly important for young people, in order to adapt to the challenges and competition posed by globalization, hence the call to action by over 70 concerned international policy makers, researchers and practitioners at the International Educational Summit at The Hague, Netherlands (Voogt et al., 2013).

In Scotland, there is an implementation of a radical change in its curriculum, the CfE, which places emphasis on the use of ICT in the classroom explicitly across all school subjects, though without clarity but 'a perceived vagueness' (Priestley, 2008) on how ICT should be applied in the different subjects at the secondary school level, in order to achieve the holistic aims of the Curriculum for Excellence. This has resulted in a perceived 'lack of a coherent, national landscape on ICT use in schools' (Morris 2010). This review will examine the impact and effects of the curriculum change on pupils and teachers especially on the feasibility of generic skills development through ICT. For the pupils, it will assess the impact of the secondary school training on transition to further and higher education and employment, and for the teachers, it will examine their competence and confidence in the pedagogical and technical use of ICT, in a 'digitally supportive' (Wastiau, Blamire, Kearney, Quittre, Van de Gaer, and Monseur, 2013) school environment aimed at equipping the pupils with 21st century skills.

2.4 The systematic review procedure.

This section consists of the procedure engaged in the systematic review starting from the formulation of keywords, to database identification, and finally to content analysis of the identified papers from the search.

The review made use of published texts from the year 2004, when the educational system witnessed increased availability of technologies with expected frequent usage in schools. Specifically, this review exercise was based on literatures from the year 2004 to 2016 due to their relevance on the research topic and also because this period corresponds with major changes in the educational policy document in most OECD countries and particularly in Scotland's educational curriculum for compulsory education. Before the implementation of the Scottish Curriculum for Excellence by August 2013, consultations have been on going with some key stake holders in education (local authorities, teachers, and parents) regarding the best time to implement and launch the changes. Similarly, efforts were made at updating the schools with different technologies to enhance teaching and learning before the implementation phase. This period represents a significant change in the Scottish educational history.

2.4.1 Methodological consideration:

Formation of Key words and key phrases.

The author commenced a systematic literature search by isolating a set of critical key words from the research questions, and sub research questions. The initial key words taken from the research questions were, ICT, perceptions, school, and generic skills. At the first search attempt with the main key word 'ICT', a lot of unrelated and substandard results

were obtained. This is because ICT, being a broad area, is involved in every discipline. In furtherance to this step, and for a more meaningful search, it became necessary to form key word phrases from the main research question –'What is the role of ICT in developing generic skills among secondary school pupils'? The essence of this is to use the keywords phrases as a guide to identifying relevant books and journals that will guide the review process for a more focused search. These key word phrases were formed using a combination of concepts contained in the research question in addition to the initial keywords that had been earlier identified. These are shown in the table below.

Table 2. 2: Formation of keyword and keyword phrases

Keyword1	Keyword 2	Keyword Phrases
ICT	Role	ICT in School
	Effectiveness	Teacher Perception
	Perceptions	Pupil Perception
	School	School Transition
		Generic Skills Development
		Positive destination
		Employability Skills
		21st Century Skills
		Transferable Skills

The result of the search using key words phrases suggests that, a limited in-depth evaluation of the effectiveness of ICT use in schools on generic skills development exists. These keyword phrases were then utilised for a more focused search. The keyword phrases

were used through a series of search methods- computerised and manual, and relevant studies for inclusion were identified.

The result from the search identified three relevant clusters based on the themes namely, ICT in education, generic skills development and post school transition. For the first cluster, ICT in schools, 454 records were retrieved from the search. Out of these, 42 met the inclusion criteria. The second cluster, generic skills development, had 115 records retrieved and 19 met the inclusion criteria. And the 3rd and last cluster, post school transitions, had 105 records retrieved and 12 met the criteria. From the above stated record, it could be deduced that a total of 73 papers met the inclusion criteria for review including 35 research based papers and 38 discursive papers. The break down includes qualitative papers (n=21), quantitative papers (n= 31), mixed methods (n= 12), longitudinal studies (n=6) and experimental studies (n= 3). While the qualitative studies provided insights and in-depth accounts on perceptions and use of ICT in school, the quantitative studies provided limited in depth description of the participants and also the relationship involved. The majority of the previous studies reviewed accommodated the teachers' perceptions and accounts, and not the pupils, thus alluding to bias. The pupils' view or perceptions constituted only 10% (n=8) of the total study. From these articles selected above, the review and discussions were then formed around the three clusters, which form the basis of the analysis.

2.4.2 Determining data base

The key word phrases which were derived from the research question were then used for a computerised bibliographic search through the four relevant databases namely Applied Social Sciences Index and Abstract (ASSIA), Scopus, British Educational Index (BEI), and Education Resource Information Centre (ERIC). The keyword phrases formulated were as follows - ICT in schools, generic skills, school transition, teacher perception, pupils' perception, skills development, transferable skills, employability skills, and 21st century skills. Other broader context search was carried out using these same key word phrases but in countries outside the UK, which has either embedded ICT in their schools or and has substantive studies carried out on 'generic skills'. These broad searches include studies carried out in the United States of America, Australia, Canada New Zealand and Ireland. Another source, the Google Scholar, helped to verify the international vocabulary as well as the grey literature which includes unpublished materials. An example of the matrix showing the keyword phrases is displayed below.

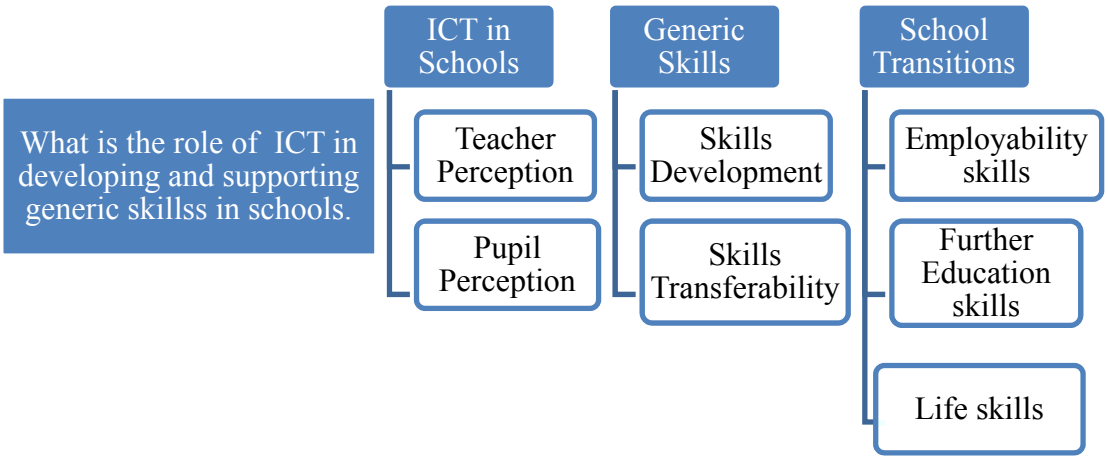

Figure2.5 Matrix showing the main research question and key word phrases.

The university of Dundee library provided access to the cross search tool which enabled the researcher to effectively utilize the search across different bibliographical data bases including the ones specifically selected by the university to be dedicated to the school of education. The advantage in this approach to the search is that multiple data bases are consulted at the same time on the search of a particular subject and then organised systematically to display the total number of articles by year, subject area, document type, and the country. It also displays the abstract of the literatures returned from the search thereby enabling the researcher to scan through the abstract and then decide for an in depth search following the link to the full text as provided.

Advancing forward from this, the identified databases for the school of education was consulted for relevant publications. Apart from the computerised search, there were also hand searches of some journals. Two important journals relating to the subject area of ICT in schools were searched. The journal of research on technology in education and The European journal of education was also searched. These particular journal searches were considered very important since most of the international directives and developments, informed the reactions at the state or local level. A tabular record of the number of studies that met inclusion is shown in the table below.

Table 2. 3: Selected data bases

Database	**Total record retrieved**	**Total that met inclusion**
British Educational Index	291	31
ASSIA	239	24

SCOPUS	126	16
Web of science	18	2
Total	**674**	**73**

Having identified these various data bases in the literature search, as well as the specific studies that met the inclusion criteria, the author went further to retrieve the materials for the review. The materials included both empirical research studies and discursive papers that met the inclusion criteria. A concise version of these papers is recorded in a table showing the author with date of the research, the country where the study occurred, the type of study- either research based or discursive paper, the theme of the study, the outcome of the study and the methodology utilised in the study. A sample of this record is displayed below while the full record of studies reviewed are included in the appendix section, appendix L as earlier stated.

Table 2. 4: Record of Selected papers that met inclusion

SN	Author and Date	Country	Paper type	Theme	Result	Methodology
1	Mundy and Kupczynski 2013	USA	Research based	Investigates the impacts of school culture on teachers ICT use	Concludes that on – site technical support will effectively aid ICT integration	Qualitative study
2	Priestly, M and Minty, S. 2012	UK (Scotland)	Research based	Investigates the teachers' views of the new Scottish curriculum, and the nature and extent of implementation in its first year in one Scottish local authority	CfE document lacks clarity in the process to guide school based curriculum.	Qualitative study
3	Clayton Kaylene, 2012	Australia	Research based	-investigated gender stereotype using 3 -the influence of school experiences of ICT use on girls career options	Intervention program promoting ICT study and work opportunities for girls	Qualitative study
4	Shapleya, K, Sheehanb, D, 2011	USA	Research Based	Effects of technology Immersion on middle school students' learning opportunities and achievement	-significant improvement in technology proficiency - no statistically significant immersion effect on students	Experimental study

					reading and maths achievement	
5	Hammond Micheal, 2011	UK-England	Research based	-investigation of pre service teachers use of ICT and the reasons for using it or not.	The IWB was central to their use because their mentors used it and also it's available everywhere. Mentoring, training and support were identified as factors influencing ICT use.	Mixed method
6	Bowman, K (2010)	Australia	Discursive papers	Conceptualisation of generic skills in OECD countries and the adoption of a single term	Opinion arrived at comparing other OECD frameworks in three other countries	Descriptive study
7	Knights Carol, 2009	UK	Research Based	Assessment of the contribution of ICT in mathematics education by small group of Mathematics teachers	The comparison of ICT usage in math classes from 2004 till 2009 still show underutilization of ICT in the classroom by teachers	Quantitative study
8	Christopher Ward, 2009	UK-England	Research based study	Looked at creativity skills through ICT in a music lesson	-Pupils were more inventive and motivated when given the opportunity -action research were used to improve learning environment	Action research/ field work project
9	Canning, R. (2007)	Australia	Discursive paper	Challenges the notion that generic skill are	Conceptualisation of generic skills and the adoption of a single term	Descriptive study

				universal, transferable and autonomous.	Analysis of core skills policy and practice in the UK. Queries the possibility of measuring Generic skill when they are transferable. There is also variation in assessment of core skill-in colleges, it is through designed investigative units and taught as stand-alone, where as its different in schools.	
10	Barton, R, 2006	UK-England	Research based	Explored the views of initial teachers on the use of technology after so much investment. Using secondary postgraduate certificate in education students in East Anglia -it focused on trainees reflections on teaching	too much information on ICT with less evidence on use -user identified clear preferences on routes that impacted more positively	Mixed method

From this record above, it became easier to organise the result of the reviewed articles to make it easier for synthesis and write up. For each of the individual searches conducted and concluded, there is a tabular record of the theme of the article, the problem that it investigated, the methodology employed, sample, instrumentation and the outcome of the study. The full record is located in the appendix and labelled appendix L

2.4.3 Inclusion Criteria

In order to deal with the issues surrounding the actual role of ICT in schools towards generic skills development and the application of skills beyond the compulsory education, a realistic and logical approach will involve setting up boundaries in an inclusion criteria list to effectively manage the literature and studies carried out in this area of study. The inclusion criteria for this review includes published texts, articles, journals, studies, and conference documents carried out in English Language within the UK, Australia, New Zealand, Republic of Ireland, Canada and America, between 2004 and 2015. Contributions from studies written in English language but published across European countries are also included in this review. Other criteria includes the following-

(a) Studies on ICT integration in secondary schools,

(b) Studies on generic skills development among young people.

(c) Studies addressing generic, transferable and employability skills.

(d) Studies on technologies involving 13 – 18 years old.

(e) Studies on generic skills transitions for post school destination.

(f) Articles on Scottish Curriculum for Excellence (CfE), upper secondary school, experiences and outcome, Skill development Scotland.

(g) Articles on teacher perception of ICT in schools.

(h) Articles on pupils' perception of ICT in school.

(I) Studies and articles on skills for employment

(j) Studies and articles on employers' perceptions of young people's skills

2.4.4. Exclusion Criteria

The exclusion criteria which are beyond the scope of this study, will include the following

(a) Studies published in other languages than English

(b) ICT Studies carried out in developing countries

(c) ICT Studies outside the context of education.

(d) ICT Studies before the year 2004

The synthesis is centred on historical information and background of the study, the major studies and debates in this field of studies, as reflected in the identified key words and keyword phrases. The methodology employed for literature search assisted in highlighting studies supporting the focus of the research. These have been organised into the following sub headings for discussion.

- The impact of ICT in education.
- Stakeholders' perceptions of ICT in schools.
- The concept of generic skills.

2.5 Theoretical Consideration

The theoretical model underpinning most of the studies reviewed in the literature review was the Vygotsky's sociocultural theory and the social constructivism theory. These theories served as perspectives used in previous studies investigating ICT use in teaching and learning within schools where ICT was part of the culture of the school and the development of knowledge was constructed from its use. These theories recognise the contextual nature of learning as well as the construction of knowledge from the immediate environment. While Vygotsky, in his sociocultural theory emphasises that humans are influenced by the mediation of tools and symbols situated in their environment and forming part of the culture (Vygotsky, 1978), the social constructivist recognises the dependence of interactions with other people as being responsible for cognitive functioning.

The following subsection will briefly critique the sociocultural theoretical perspective while exploring the perceptions of users of ICT in schools on generic skill development. Through this study, the sociocultural theory will be extended and contextualised to address the notion of 'mediation tool' (Vygotsky, 1978) as part of the school culture within the sociocultural framework.

Sociocultural theory considers human knowledge as being constructed through interactions and social relationship among individuals (Vygotsky 1985, Feryok, 2013), using mediation tools. Mediation in this context is the use of certain tools within socially organized activity. These tools which includes signs, symbols, numbers and language are fundamental to communication and relationships and are unique to various social and cultural environments. As the theoretical framework of this study, sociocultural theory

provides important insights into teachers' and pupils' perceptions on the use of ICT, taking into account, the historical and cultural implications of their interaction with the learning environment, which in turn shapes their values, feelings and perceptions. The following section explains and evaluates the sociocultural theory, incorporating a discussion on researcher's positionality.

2.5.1 Sociocultural theory

It is remarkable to say that the ideas of Vygotsky (1896 – 1934), an educational psychologist has had a great influence on the educational system, particularly in his unique contribution to teaching and learning through his concept of the zone of proximal development (ZPD). His beliefs in socio cultural settings, as a determining factors to the development of higher order thinking is well documented (Vygotsky, 1978; John - Steiner and Mahn, 1996; Rizvi and Lingard, 2010; Lantolf, 2000). Vygotsky believes that human mental activities, including 'voluntary attention, intentional memory, logical thought, planning and problem solving' (Turuk, 2008, p. 245) occur and are influenced by the unique social milieu.

According to Vygotsky, (1978), an individual is presented with a variety of tasks in this sociocultural environments and is engaged through the tools that are in his environment, including getting assistance from his parents as representatives of the culture for guidance. Wertsch (1985) remarks that knowledge is then transmitted to the child through his first interaction with his environment (interpsychological plane) which the child assimilates and adds his personal value (intrapsychological plane), thereby making a transition from social to personal values. In this circumstance, Vygotsky argues that learning occurs by imitation and by replaying what has been observed, experienced and internalised, which

then awakens a variety of internal developmental process that shapes human thinking. In understanding the influence of mediational tools, an evaluation of the individual's social and cultural environment becomes necessary. As Land, Hannafin and Oliver acknowledged in Jonnasen and Land (2012), understanding human thinking and learning is best contextualised to the setting within which it occurs and as such all teaching and learning becomes conditional, contingent, and responsive to the social conditions inherent in the constantly changing environment (Anh and Marginson, 2013). Similarly, pupils in school are likely to observe their peers and teachers' capabilities which they later internalise and mingle with their internal values which shape their thinking and learning. Sociocultural theory draws a connection between learning and development using the following areas, namely, social sources of individual development, semiotic mediation in human development and genetic analysis (John-Steiner and Mahn, 1986). These three areas which make up the major themes of the sociocultural theory will be discussed in details below and contextualised to the school setting.

Social sources of individual development:

Human development is dependent on the care givers in a persons' immediate environment and as such the individual relies on the wealth of experience that is transmitted from his/her environment. As Wang, Bruce and Hughes, (2011) remarks, social interactions are responsible for the human development and are aided through tools and engagement with other people, objects and events. This highlights the importance of learners' interaction with other peers, particularly 'the more capable peers' (Vygotsky, 1978, p.86) in a social environment, which can either be the school, work or home environment. This interdependency then makes it difficult to separate human cognitive development from

social cultural and historical context (Johnson, 2009). According to Lave and Wenger (1991), the opportunity that exists in the cultural setting / environment of pupils which enable them to learn through repeated and varied experiences, sometimes, with guided support, also reflects in developing skills for specific cognitive activities. This style of learning is effective due to pupils' internalization of knowledge from watching and participating in group work like group projects and recreation which sharpens their understanding of their environment (John-Steiner and Mahn, 1996).

The school setting offers such interactions from different categories of individuals namely, teachers, pupils, parents, and external bodies (Local education authorities), in addition to resources and facilities situated within the school environment which influences the development of pupils and change within the school.

As a teacher and a researcher, having been exposed to different cultural settings (classroom and workplace environment) with a focus on how to influence learning through interactions among my pupils and colleagues respectively, I have witnessed the impact of an environment and the cultural belief of the learners influence the learning process, particularly as the mediation tools (the computers, for instance) dictate the language of the environment and gives access to knowledge. In these situations pupils and colleagues have the opportunity for independent problem solving as they explore different actions with the available tools in their environment and learn different skills from their peers and teachers. These associations and interactions between peers (pupils) can be productive due to the learning opportunity that it provides and the benefits of the interactions with peers, resulting to independent development of generic skills.

Semiontic mediation in human development:

According to Vygotsky (1981), semiotic mediation (which is the study of signs and symbols and their use or interpretation) is the key to the co-construction of knowledge. This is because 'tools' are the mediating factors binding both social and individual functioning and these tools include computers, arts and crafts, calendars, paint brush to mention but a few. These tools are engaged in social and individual activities and are central to knowledge acquisition and learners development through the representational activities by humans (John-Steiner and Mahn, 1996). In schools, just as in homes, most social and individual activities by the pupils are carried out through computers, the internet and interaction between their parents. Pupils are engaged with different online activities and online communities using these tools which assist them in developing communication and other cognitive functions for operating within their community, which becomes part of their culture. Over time, these skills and knowledge are internalised by pupils, which transforms their learning process.

As Wertsch (1991) remarks, the two different levels of internalization of socially shared process can occur between people who are involved in social interaction (intermental internalization) or within the individual (intramental internalization). While the pupil will need step by step assistance of an adult in the former, pupils can do without any form of adult assistance in the later. As communication is a fundamental outcome of mediation tools used for interactions either as a form of expression or in maintaining an existing relationship (Furberg and Arnseth, 2009), sociocultural theory reaffirms that the understanding of these tools which are either in the form of signs, tools or symbols, is a precondition for understanding the human mind and its associated actions. These tools are

inherent in the culture of the immediate environment and form part of the culture of the environment. Culture plays an important role in influencing the understanding of the individual living within a certain environment, particularly as it shapes the learning and thinking ability of the individuals living within it.

There are varieties of ways through which interactions among pupils could be encouraged and improved within the class setting. Pupils are able to identify language either in the form of tools (ICT) or in the associated generic skills from such use which helps them to identify knowledge situated in their localised environment where learning is taking place. In the school settings signs and symbols which are represented by the curriculum policy, informs the language of the school which is internalised by both pupils and teachers. This goes further to suggest that there is a relationship between sociocultural theory and the Scottish Curriculum for Excellence especially in the understanding and interpretation of the semiotic mediation. While the CfE encourages the sharing and co-construction of knowledge through active participation and learning, it advocates for the social use of tools in shaping the development of the individual human mind (John-Steiner and Mahn, 1996; Education Scotland, 2016a) as evidenced through the explicit use of ICT in Scottish schools.

Genetic analysis:

As learning and development take place socially and culturally, sociocultural theory emphasises on the process of establishing higher forms of knowledge rather than the product itself. This is because of the methodical and systematic procedure involved at the different phases before arriving at a framework binding ‘the interconnectedness between external devices, psychological tools, the individual and the social world’ (John-Steiner

and Mahn, 1985, p.6). Several changes occur historically and culturally which opens up opportunities for learning and development. The individual recognises the possibilities of engaging various channels and activities to perform a task. This is similar to a teacher in the classroom introducing different strategies to arrive at a lesson outcome. Similarly too, it is likened to pupils planning out different activities in their learning environment to perform a task. These discussions are further contextualised to the study and the classroom settings.

2.5.2 Contextualising sociocultural theory.

The sociocultural perspective advocates that ICT cannot be studied in isolation of a learning environment (either school or home), which is a broader context, in which it is situated. Similarly, it cannot also be studied without the rest of the tools and participants, and the whole configuration of events and activities (Lim, 2002) which completes the enculturation process. As Salomon (2006) purports, the dependency and interplay that exists in today's classroom makes it difficult to separate ICT in school from the whole teaching and learning exercise, since they all co-exist in one environment, the learning environment.

The learning environment includes the school environment, resources, policies, stakeholders (teachers and pupils) as well as the interaction that exists in between. The school setting offers an insight into teachers and pupils perceptions of the mediating tools which forms part of the language and culture of the school. Vygotsky (1978), explored learning and development further as inter dependent variables and acknowledges the unification between learning process and development, recognizing that some of these internal learning and developmental process occur while pupils internalise the activities

that occur in their environment, either through interaction and cooperation with people (teachers, peers, parents and experts), objects and social event (Vygotsky, 1978). As a practitioner in a school environment, an understanding of this environment helps to discover the knowledge that is situated within the school culture, which shapes the individual mental functioning. However, situated knowledge can also be utilised in different ways and at different situations other than the school environment, particularly with the influx and availability of ICT

2.5.3 Integrating the sociocultural theory:

With the influx of ICTs in the socio cultural setting of schools, ICT becomes a mediation tool, responsible for noticeable changes in activities, curriculum and even in the interpersonal relationships in the learning environment. The study of ICT in school considers the social processes involved in the integration and use of ICT which influences the development of generic skills in the form of critical thinking, problem solving, team play, communication and presentation skills. This has implications for the teacher and the pupils respectively. For the teacher, there is a need to rethink how best to strategize either in delivery or content, towards the learning outcome. For the pupils, there is a need to devise alternative approaches on how best to use the tool in order to realise the reasons for schooling which is paramount. However, the power of these mediation tools are often not consciously recognised by the users (pupil and teachers) and even sometimes neglected until the need arises. For instance, the use of word processing in the classroom, as documented in the study carried out by Cochran-Smith in 1991, realized that pupils make more use of only basic features and functions. These basic functions of word processing mostly in use, includes grammatical and spelling corrections, or formatting and

having nice printouts as against the more powerful editing functionality of the Word package, thereby suggesting that the real potentials of the ICT are not being utilised and as such will not have a significant effect on learning and teaching. This situation is not different from what is obtainable currently in school as pupils and teacher tend to under use the available tools for learning in the 21st C.

Another implication of having ICT as a mediation tool is that the experiences of working with ICT encompasses activities of its integration to the teaching and learning. This then makes it difficult to extricate ICT use in school from the social processes that it supports during its use, including the actual experience of use, which, if integrated into the learning discourse will develop higher order thinking skills (Lim, 2002). As Salomon (1993, p.189) proposed,

"no tool is good or bad in itself: its effectiveness results from and contributes to the whole configuration of events, activities, contents and interpersonal processes taking place in the context of which it is been used"

Therefore, as living in the 21st century will demand the use of 'subject specific knowledge and also generic skills for current and emerging needs of practitioners' (Richey, 1998, p. 7) the present study's focus will be on events and activities associated with the role of ICT. These associated skill gains will ultimately act as a sustainable solution to both professional and social problems that are inherent in the society.

2.5.4 Limitation of the sociocultural theory:

Vygotsky's sociocultural theory lays much emphasis on mediation as a tool to learning. According to him, mediation, whether human or symbolic, comes through 'the more knowledgeable other' which can be the teacher or a skilled adult, aimed at enhancing the learning experiences of the pupil. It is believed that through social interactions between the skilled and more knowledgeable adult or teacher and the pupil, effective learning will occur (William and Burden, 1997). However, Vygotsky failed to recognise that learning can also occur discretely, independently and in solitary places within the pupil's environment (Kozulin, 2002) which is different from the active learning being portrayed through mediation. The interaction from experienced adult and teachers which he claims effectively leads to learning can also come from peers and not only teachers as earlier assumed by Vygotsky.

One interesting contribution of the socio cultural theory as recorded by Ellis (2000) is the identification of the Vygotsky's zone of proximal development in pupils. This is explained as a period of learning between a child's actual level of development, which is marked by independent learning and his potential level of development characterised by assisted learning. However, the zone of proximal development does not take into account the child's capability level at the time of performing the task or even the motivational influences. As recorded in this study most pupils are on an intermediate skill and expert skill level, and these skill levels were mainly achieved from home where they have unrestricted access to ICT through independent learning, prior to attending school. The ZPD of the pupil will be challenged at school if there are no recognition of these acquired skills from home and the impact of these skills on any new task at school.

Vygotsky (1978) argues that from birth, development and learning are interrelated and inseparable but failed to explain the process of development and how it occurs (Chaiklin, 2003). Shayer (2002) reports that the application of the ZPD is problematic particularly in the practical implementation within the classroom. Since the important thing that naturally happens in school is about positive progression of students from one class year to another and the associating supporting role of the teacher towards the effective progression of the students, it is then an obvious requirement for the teacher to be equipped with the information or advice on how to support the pupils.

Furthermore, as participation and engagement vary from one learner group to another, with varying skill set and learner capability, so does the meaning of such engagement. This challenges the idea of a homogenous social and cultural group which the sociocultural theory proposes (Lui and Matthews, 2005). For instance Learners with learning disability will not thrive in the same cultural or social group as learners without. In fact, group activities and interactions might not have the same meaning within such group. The variations in ICT skills possessed by the pupils before coming to school, also determine the type and level of interaction. Similarly, the effectiveness of the learning aids for pupils support will also vary according to the individual's needs

The sociocultural theory did not recognise the qualities and attributes of the individuals but instead emphasized on the collective qualities of peers in collaboration or the 'more knowledgeable other' (Vygotsky 1978). For instance in the case of gifted pupils, whose abilities can rise above social norms (Lui and Matthews, 2005), the theory fails to recognise this possibility which can come up due to personal understanding and familial impact on the individual pupil.

2.7 Synthesis and Discussion

2.7.1 The impact of ICT in Education

Globally, and in recent times, classrooms in the UK as well as in some developed countries, had witnessed a continuous increase in the supply of new technologies and the upgrading of existing ones. This has been either in the form of learning software and games or hardware like interactive whiteboards and computers (Pivec, 2009 ; Brown, Lauder, and Ashton, 2008; Livingstone, 2012) . This upgrade in school technologies has determined the general perception of schools that are considered effective and efficient because of the presence of technologies. Similarly, the educational sector in the UK has witnessed an increase in the regular amount of funds channelled to it, with the highest spending of £880 million on ICT alone in 2008/9 (BECTA 2009a) and £550M in 2013 (Silverstone, 2013). This constitutes a significant proportion of the total spending for those years, thereby raising concerns among scholars, as to whether the integration of ICT into pupils' learning experience is the single most important facilitator of learning in modern days (Livingstone, 2012). It also raises a question on the real purpose of ICT and technologies in the classroom and if such purpose has been met.

In spite of these significant fast- paced developments and investments by the UK Government in a range of information and communication technologies in schools, research shows that schools are yet to fully embed ICT in the teaching and learning process and ICT is yet to generate the significant changes expected of the young school leavers to enable them to compete globally in the information and knowledge society. The

information and knowledge society is associated with the 'explosion of ideas' (Anderson, 2008, pg. 5) due to the availability of information and communication technologies just as the economic society is characterised by ideas and knowledge which are treated as commodities (Anderson, 2008). It is therefore worthwhile to investigate further, the usage of the various ICTs in school to identify their actual role in preparing the pupils for this information and knowledge society and more importantly on acquisition of the skills most needed in the 21st Century (Sangra andGonzalez-Sanmamed 2011).

Arguably, there is no doubt that ICT integration into educational processes has made significant impact towards enhancing learning and bridging gaps in the forms of knowledge acquisition (home, school, work and community) as well as in the 'traditionally dislocated' technologies (e.g. books, writing, telephone, television etc) (Livingstone 2012). Earlier studies on the impact of ICT use on learning and learners also have recorded evidence of a positive impact. Some examples are listed as follows.

Firstly, The IEA SITES study (2006) investigates to what extent and how ICT is used in education and how it supports and boosts teaching practice. The study found that the impact of ICT on pupils' performance (based on the teachers' perceptions) was significantly dependent on teaching approaches (Law, Pelgrum and Plomp. 2008). The study further reveals that teachers are most likely to use ICT in school if there is technical, administrative and infrastructural support.

Secondly, The Global Information Technology Report of 2008-2009 emphasizes the relevance of a coherent government vision on the usefulness of ICT tied to an early focus on education and innovation (Dutta and Mia 2009). This emphasis could lay the foundation for sustainable growth.

Thirdly, the Program for International Students Assessment, 2006, indicates that (on average) pupils with access to a computer at school outperform those without (Bybee, McCrae, and Laurie, 2009).

Fourthly, the European Schoolnet ICT Impact Report (2006) indicates that ICT has a positive effect on students' attitudes and communication skills and increases students' reflective skills on the learning process and its outcome (Balanskat, Blamire, and Kefala, 2006).

Other studies have been recorded by Lei and Zhao, 2007, and Hennessy and Deaney 2007 as supporting these views. Overall, these studies indicate that ICT does promote positive and independent attitudes and outcomes for both teaching and learning activities.

However most of these earlier studies on the effect of teaching and learning focused on the 'instructional delivery of ICT', as against the 'traditional teaching method' (Lai 2008) and are mostly international impact studies and as such not adequate for comparison. For instance, the IEA SITES 2006 survey research which investigated pedagogy and the use of ICT in school involving 22 participating educational systems, 9000 schools and 3500 mathematics teachers, drew an international comparison on the use of ICT in teaching among Science and mathematics teachers only. This comparison was mainly on 'how they use ICT', and did not include teachers in other disciplines. Although the use of ICT was more prevalent with science and the mathematics teachers, (even in same countries) as at the time of survey, the restriction of the survey to science and mathematics teachers limits the generalizability of the result across schools in same country and across countries as well. It could be argued that if teachers of other disciplines were sampled, there would have been a more varying and valid result. The instrument used in the study for data collection could also introduce bias in the final outcomes. Therefore a mixed method

approach could get an in depth knowledge and understanding of the social phenomenon being studied.

Another international study, the School Net impact study, 2013 drew comparison on the impact of ICT in schools among European schools and recorded a range of benefits to learning. However, these results or its positive impact may have been as a result of the individualised Country's government policy and benchmarks. The nature of the educational system of the country may also have contributed to the way in which the ICT impact was assesses. Whereas the UK will assess the impact through a systematic national Exam like the PISA, the Nordic countries would assess ICT impact qualitatively by recording the perceptions of teachers and pupils (Plomp andVoogt 2009).

A study carried out by Condie and Munro in 2007 examined the impact and role of ICT in enhancing learning outcomes, and they found, though with less supporting evidence, that there is a positive correlation between learning and ICT integration in classrooms especially where ICT is embedded in every day learning experiences of pupils. However, the result of this study was from a desk top review of existing literatures, policy documents and research reports. The focus was mainly on specific ICT in schools (the interactive whiteboard), and supports only the natural classroom. Consequently, the result of the study was very restrictive and could not be generalised. This exclusion of the virtual classroom, contradicts the everyday learning experience which can occur anywhere with ICT.

In another study by Wong and Li 2008, which investigated the role of ICT in effecting changes on students learning. The research found that a contextual factor, such as the socio cultural setting of the school contributes to effective ICT implementation and enhanced learning. This study, with a large sample size comprising of all primary and secondary

schools in the 18 districts of Hong Kong, recruited a total of 1076 teachers from diversified subjects, representing all taught subjects, thereby increasing representativeness of the population. However, it could be argued that the idea of mixing results from two learning organisations (primary and secondary schools may result in conflicting position / outcome on ICT integration in schools due to varying school structures, cultures and ethos (Mundy and Kupczynski 2013). The current review has a major focus on secondary school pupils and teachers from all taught subjects on the development of generic skills through ICT. Similarly there is a strong perception of positive enhancement of teaching and learning outcomes through ICT integration in classrooms, though with varying opinions from different scholars regarding its benefits. There was also researched evidence of the positive impact of ICT on learning and teaching experiences, (Deaney, and Hennessy, 2007; Balanskat, Blamire, and Kefala, 2006; Spiezia 2010). A study carried out by the Institute of Educational Science in March 2007 investigated the effectiveness of reading and mathematics software products through an experimental design. The outcome revealed that there was no statistically significant difference between the text scores from the control group and the experimental group, thus generating the inconsistencies in research claims on ICT (Dynarski 2007).

However, there are also other perspectives justifying the rationale for the embedding of ICT in the educational system, which seems to be a driver for the current pervasiveness of ICT in schools and beyond. The changing nature of society, from the industrial to the informative or knowledge society, has suggested the retraining of pupils in preparation for the knowledge society otherwise regarded as the 21st century. This shift from labour forces for specific duties to a knowledge- based labour market will require labour force

with generic competencies / skills (Young and Chapman 2010). The implication is such that a reassessment of the current skills in the current work force as well as equipping the young school leavers with the expected generic skills has become apparent. This means that in other to meet the core competences or skills requirements of the twenty- first century (Selwyn and Facer 2007; Lai 2008) some necessary adjustment needs to take place. But to achieve this, certain factors or variables inherent in the school community will need to be reviewed. Whether these are better done collectively and reflected in the curriculum as mandatory for schools or individually done by schools is still subject to debate, especially among stake holders in education.

Notably, some variables (external and internal) are considered for embedding ICTs in schools. Some of the external variables in schools include accessibility to ICT equipment, time planning for instruction, technical and administrative support. Most of these factors affect the integration of ICT in schools. It is expected that where there is a higher technical support and increased availability with frequent access to ICT, there will be more positive integration by teachers. Often times the lack of these variables or its effectiveness depend on the school culture and style of organisation. For instance, a qualitative study carried out by Mundy and Kupczynski (2013) which investigated the influence of school culture in ICT integration and its sustainability in schools, confirmed that technology availability and overall technical support are of high importance to technology integration and should run simultaneously. The study further designed a program that supports the day to day teaching activities for effectiveness, by making use of interns. This external factor, in the form of on-site technicians (interns) is considered of high importance to ICT integration, even though the presence of the interns could also be perceived negatively as it could

challenge the authority, autonomy and confidence of the teacher. However, this method may have impacted and enhanced the teaching process greater than the actual learning (Munro, 2010), just as its small sample size of 2 schools can flag up the issue of bias and generalizability.

Similarly, there are internal factors influencing technology integration outcomes, ranging from understanding and expertise of ICT use, motivation to use, beliefs, self-confidence; technology skills; and readiness to use ICT itself (Sang, Valcke, Braak, and Tondeur, 2010; Tezci, 2011) , These factors are unique to schools but to varying degrees of differences (Bingimlas, 2009; Tearle, 2003). In a supporting view, the study on ICT in teachers' training by Davis, Preston, and Sahin (2009) concludes that integration of ICT is very complex and considers the role of the external and internal factors as very fundamental to its success.

An important internal factor and a critical change agent is the teacher. Being the variable with the strongest impact on ICT integration in classrooms, their attitude and perceptions are crucial to generating actual benefits from ICT integration in schools (Law, 2008). A mixed study conducted by Palak and Walls 2009 investigated ICT savvy teachers and those who have worked in ICT integrated schools to ascertain if their beliefs and attitudes can be modified towards student- oriented paradigm. The study found out that belief was not a powerful predictor of practices but rather attitude of the teacher was more of a determinant factor for the sustainability of ICT use in classrooms. The study also emphasized the high confidence level of teachers as responsible for ICT integration in schools. It is noteworthy that ICT integration in schools will keep evolving as the schools evolve too. However, the digitally supportive schools and the overall school culture will be a determining factor to the evolution.

Current emphasis in schools has been on the usage of particular software and applications rather than emphasizing 'genuinely on transferable skills' derivable from ICT knowledge and usage (Morris, 2010a). In UK secondary schools, pupils are more conversant with the presentation skills benefit from ICT than otherwise (OFSTED 2009), and this has been traced to the emphasis by their teachers on that aspect of ICT packages, thus highlighting the impact of teachers' skills base on the pupils. However this may be attributed to the confidence level of the teacher in the use of the specific ICT for effective presentations. It can also be the requirements of the actual teaching subject for effective teaching. Similarly, the longitudinal study carried out by Lei and Zhao in 2007 in an American middle school confirms this role of the resource as being subject dependent whereby certain subjects like maths, science and history, perceived as 'hard work', determine the type of ICT employed by the teacher (Lei and Zhao, 2007).

These different views and opinions on the impact of ICT on education, not only suggest the different role it is playing in the classroom and in education generally but also recognises its dependence on other factors in accomplishing those roles. With these developments in mind, it has become necessary to conduct a review of the impact, appropriateness and relevance of the various ICT in schools on the pupils growing up in an information and knowledge society, especially in relation to the future aspirations of the pupils and their post school destinations. Moreover the appropriateness of pupils' development from school with regards to the comprehensive set of skills required to cope with everyday life (Mioduser, Nachmias, and Forkosh-Baruch, 2008) and their general capability through interactions with ICT has become an important outcome of schooling (Anderson, 2008)

2.7.2. The impact of ICT on generic skills development

Determining the skills and competences that young people would require for living and the workplace is an area of crucial concern within the European Union (Eurydice 2011). The recently adopted initiative on new skills for new jobs provides a new overarching framework (EC 2010) and the framework captures the lack of ICT skills as one of the seven most important obstacles towards harnessing the potential of ICT (EC 2010).

The research in education identified six stakeholders as follows: government, teachers, pupils, parents, employers and local communities. Usually, the government generates the policy direction on the curriculum for its educational system and provides the funding for the implementation of the policies. As Kidner (2013) purports, the new curriculum in Scotland engaged these stakeholders between the consultations drafting periods of 2007-2008 before implementation in August 2013, and identified the teacher as the key stakeholder in education which must be provided with the professional development and support for enabled confidence in taking increased responsibility.

Similarly, the pupils (learners) are at the centre of the Scottish curriculum (Curriculum for Excellence, 2013) and are expected to acquire certain skills fit for the knowledge society. Generic skills such as problem-solving, communication, analysis and reasoning could lead pupils to further education and employment. Pupils could also use transferable generic skills such as decision-making, critical thinking, action planning and self-presentation to manage their employment plans, career decisions and routes. Therefore, the employers are also key stakeholders in the processes of learning since part of this learning is to enhance job prospects and employability. But whether ‘key’ or ‘core’ basic skills should be

implemented in the workplace or school-place or both is debatable and requires clarification and grounding in the curriculum.

However, in a bid to resolve this, the UK Government launched the Governments Skills for Life Initiative which was concerned with basic skills learning at work, (Economic and Social Research Council, Information Centre, 2009). The project was based on the assumption that an improvement in basic skills such as numeracy and literacy will increase employees' productivity and employability. The findings from the study, led by Prof. Alison Wolf (2011) reveal that workplace basic skills courses are having little impact in their current form as the workplace does not support formal learning, since firms and organisations find it difficult to fit classes into work patterns. The implication of these findings is that basic generic skills are better implemented in schools rather than the workplace.

In Scotland, core skills are broad transferable skills required for active citizenship. They include communication, numeracy, problem solving, ICT and team work. The four capabilities of the CfE (of successful learners, confident individual, effective contributors and responsible citizens) is emphasized and described through attributes and skills. Although the aims of the CFE includes the development of the four capacities, along with generic skills (also referred to as key skills), up to age 18years, the setting at which to accomplish these aims seems to be restrictive for the pupils (Priestley, and Minty, 2013). These restrictions are manifested in the availability and management of resources, limited opportunities and restricted educational experiences which in turn impacts adversely on the skills and capacities as proposed by the CfE. These skills are generic skills as represented visually as the figure below.

Figure 2.6 Generic skills from ICT use in school

ICT skills, having been identified as core skills have continued to dominate the educational sector. The changing need of economic and social development has created the rise and need of a wide range of new skills and competencies, known as the 21st century competencies (Young and Chapman, 2010). These competencies having been considered as key enablers of responsible citizenship in knowledge based and technology-pervaded economy (EURYDICE, 2009) and have been linked to issues of educational attainment and its importance for advancing robust learning strategies for pupils other than it is to educational needs. In most instances also, the teacher's limited knowledge to certain kinds of technologies (BECTA 2008) or a preferred kind of technology (Marshal et al. 2009) determines the content of the teaching. This style of introduction and teaching of ICT in secondary schools further confirms the findings of the Condie and Munro 2007

publication which suggests that the development of ICT in UK schools is patchy. In Scotland, where ICT is an integral part of the 'core skills' in compulsory education, a comparative study carried out on secondary schools and colleges in Scotland (Davidson and Elliot, 2007) also confirms that 'core skills resources' were reasonably well-known in the colleges than in secondary schools where the level of uptake is very low. This low uptake in the secondary school sector may be attributed either to the fact that the term is unpopular or perhaps needs to be introduced in the schools. It then becomes necessary at this juncture, to look at the concept of generic skills, especially from the historical perspective, to clarify its conceptualisation, importance, and the need for an early introduction at school.

2.7.3 The generic skills concept

The concept of generic skills is not novel but the actual terminology became popular from the late 1990's. Based on Ralph Tyler's pioneering work in the 1940s, most texts on curriculum development from the 1950's tended to guide curriculum developers towards the selection of skills needed for effective social functioning, work performance and human development through the life of an individual (Cornford, 2005)

Since the 1970s, there has been increased recognition of the need for lifelong learning, which has led to the specific use of the term 'generic skills'. Subsequently, lifelong learning is assumed to involve the employment of generic learning skills, but these skills are not really spelled out in the lifelong learning literature.

Currently, generic skills can be found under a variety of names. In the USA, generic skills are known as 'Secretary's Commission on Achieving Necessary Skills' (SCANS).

In the UK, generic skills were initially known as ‘core skills’ and recently as ‘key skills’. In Australia, they are known as ‘key competences’, in Austria they are ‘dynamic skills, whereas in New Zealand and Canada they are regarded as ‘essential skills’. These conceptual groupings across these western countries cover in broad terms the type of skills that are considered essential for effective workplace productivity and employment (Forfás, 2006; Halász and Michel, 2011).

The emergence of these kinds of work skills in educational policy documents signalled a major change in educational expectations in secondary education and a move away from older liberal education ideals in the western world. Increasingly schooling systems and curriculum have generic skills embedded into them, in order to meet the emergent needs of the knowledge society and of employers. However, arguments on generic skills form a part of the continuing historical debate about the proper purpose and objectives of education, particularly secondary and tertiary education (Canning, 2007).

The intention of Western governments with the support of political and business leaders is that these generic type skills should be focussed on satisfying employer needs based on increased international competitiveness (Bailey and Stanton, 2003, p 14-19). What is not clear is the means by which the abstract ideals of generic skills can be translated into practice, underlining the importance of understanding both the process of transfer of learning as well as generic skills policy implementation issues.

2.7.4 Generic Skills Definition.

This section defines generic skills and identifies the theoretical foundation for defining or classifying generic skills; and develops the historical perspectives on generic skills. This section also explains whether there is a difference between generic skills and core competencies, since both terms are often used interchangeably in the literature.

Basic skills are generally taken to refer to basic literacy and numeracy (i.e. foundation skills) or to what is widely regarded as 'survival' or 'life' skills (EC, 2004, p3). The restrictive nature of basic skills prompted in the early 1990's the need for scholars to define 'the new basic skills' that could be provided through lifelong learning. This new framework of basic skills covers ICT, technological culture, entrepreneurship, social skills and foreign languages. For instance, the European Council (Feb. 2002) produced a detailed work programme which extended the list of basic skills to include; literacy, numeracy (foundation skills), basic competences in mathematics, science and technology, ICT and use of technology, learning to learn, social skills, general cultures and entrepreneurship (EC, 2002/ C142/ 01). These additional skills over and above the foundation skills (base skills) are referred to as generic skills.

The clear intention for introducing generic skills in school curriculum is that knowledge and skills resulting from the initial learning foundation will reflect in non- learning settings and particularly in the work place, thereby resulting in greater efficiency through more effective knowledge and skills usage. Effectively, generic skills are envisaged as a convenient way of achieving the desired higher levels of productivity and national competitiveness. The more costly alternative would be to contemplate specific, continuing

education with every change in technology and work processes. Therefore, the development of generic skills entails the transfer of learning through the process of adaptation and application of existing knowledge and skills to new and different contexts.

The terms 'skills', 'attributes', 'competences', and 'core competences' tend to be used interchangeably within the literature and this has the potential for creating confusion (Male, 2010b). However, the NQAI defines skills and competences as follows- "Skills are action –oriented personal plans for the performance of tasks in interaction with the environment. The exercise of a skills is the performance of a task that in some way responds to or manipulates the environment of the person. Competence is the practical application of knowledge or skills over a considerable period of time. The unique characteristic of competence is the effective and creative deployment of knowledge and skills in human situations. Competence draws on attitudes and values as well as on skills and knowledge and refers to the process and outcomes from the application of knowledge and skills to a set of tasks and is typically acquired by practice" (Forfar publication, p.22). Competence is considered to embrace a combination of skills, knowledge, aptitudes and attitudes and to include the disposition to learn in addition to know-how.

2.7.5 Do Generic Skills Matter?

To ensure that what is learnt in schools on generic skills will actually translate into effective performance at work, it is pertinent to examine critically the following.

(a) Whether generic skills exist;

(b) Whether generic skills are transferable;

(c) Whether generic skills can improve employability;

(d) The educational values of generic skills.

A ‘skill’ may be defined as “an item of individual behaviour which is orientated towards a goal, is successful in attaining that good on most occasions it is enacted and which has been acquired by training and practice” (Hyland and Johnson, 1998). This suggests the meaning of skills to be confined to a definitive setting (Robles, 2012) which then determines the kind of skills to be acquired. Some critics have argued that while the skills of playing tennis or plastering ceilings do fit this definition, the more diffuse accomplishment referred to as ‘generic skills’ do not seem to fit. On this basis, some critics have concluded that ‘generic skills’ are non- existent. However, current definitions of generic skills include skills that can be acquired by training and practice and then assessed (Boreham and Canning, 2008). For example operating a word-processing package. Nevertheless, some scholars believe that much of the content of generic skills is too vague and difficult to assess or measure. This radical view is somewhat supported by the way in which the definition of core skills has shifted over the years, as governments alter the social and political purposes for young people’s employability. For instance, in Britain emphasis on the development of generic skills shifted from language education in the 1980’s to enterprise education in the 1990’s. In recent times, the emphasis is on development of softer skills which includes team work and improving one’s own learning (Warhurst, Keep, and Grugulis, 2004) and most recently problem solving and critical thinking (Jones, 2009).

The generic skills policy is based on the fundamental assumption that these skills are ‘transferable across education and work context and that the acquisition of such skills will

enhance learner flexibility, adaptability, autonomy and employability' (Boreham and Canning, 2008). However, some researchers (Green, Ashton and Felstead, 2001; Green, 2009) have questioned the assumption that skills learned in one context can be easily transferred across contexts. Such researchers have argued that skills can only be transported across contexts except at the lower levels of employment and between very similar situations. One of such researches into how generic skills are acquired suggests that these are learned on the job and not transferred from schools, colleges and universities (Green, 2009). Green argues that it is more important to regard communication as part of the culture of the workplace in which the new employee participates, because the pattern of situated interactions in the workplace is constructed between the members of the work force and this is highly dependent on the organisation's culture.

Nevertheless, employer groups have continued to support the generic skills agenda in national policy debates. This has been the case since the agenda originated from employer-led debates about the generic skills that are needed to improve young people's employability in a modern economy. Although employers value generic skills, a recent survey in Scotland revealed that these skills are interpreted by the employers as the new recruits' pre-existing dispositions and attitudes, rather than skills acquired through formal education (UKCES, 2013). This view is supported by data from the Scottish Household Survey which suggests that specific occupational skills are more in demand among employers than generic skills (Patterson, et al, 2004).

There has been a limited amount of empirical evaluation of stand-alone generic skills units and these have yielded mixed results. This prompts the need for further empirical research on the subject area in order to ascertain if it is a better place to introduce these skills at the

secondary school level, rather than at the university level. Critics have argued that university lecturers are usually subject specialists with little interest in generic workplace skills and with little training in teaching those (Green, 2009). The notion of 'skills' often connotes 'training'. It has been widely recognised that advanced industrialised economies require the use of continually greater skills. Thus, an increasingly educated work force is demanded by all governments of such economies. But as Green (2009) purports, 'skills' does not mean exactly the same as 'education' because the education that an individual has received is but a loose indicator of how skilled the individual is, or will be, in the work place. Education can be a good indicator for some occupation- specific skills, but even most professional jobs require more than technical expertise for an individual to become a competent worker. In most cases, what is required is a combination of communication and interactive skills, the ability to work autonomously and traditional cognitive skills. Thus, generic skills are thought to be an essential component of the growing demand for skills.

Most tasks require occupation- specific skills to perform them but the generic skills are something that is required in a wider range of jobs. For instance, computer programming is an occupation- specific skills, but a wide range of jobs require interactive skills (e.g. communication) which are some of the generic skills needed in the workplace. In higher level employment, occupation- specific skills tend to be the most important relative to generic skills.

However, for low level employment, generic skills may be relatively more important. For example, a job might not need much formal training for an individual to acquire technical expertise but might still need good communication skills. Studies of individual workplaces or sectors in recent decades have often shown that generic skills are becoming increasingly

important. However, in the past few years, quantitative research has demonstrated that the growth of generic skills use is extensive across much of modern industry. For instance, the three UK Skills Surveys of 2001, 2006 (Felstead, Gallie, Green, and Zhou, 2007) and 2011 has shown the growth of generic skills, using the job requirements approach to frame questions about the tasks involved in the respondent's work It has also shown an increase in the Scottish education and training system's ability in developing skills and qualification of the workforce (Felstead, Green, and Jewson, 2011, 2012). In these surveys, employers were asked about the importance of communication skills (e.g. making speeches and presentations), the importance of planning activities, physical stamina, etc. The range of skills (domains) examined were - numeracy, influencing, self-planning, literacy, physical, checking, communication and problem solving. The responses were scored and averaged in groups to give indicators of generic skills in these domains.

The surveys reveal that between 2001 and 2006, the skills that have grown in use the most are influence, literacy, and self-planning. These domains are aspects of communication and interactive skills. This quantitative evidence confirms the earlier unsystematic reports of case studies about the increased importance of such skills. The surveys also show moderate increases in numeracy skills use and in external communication skills. There were smaller increases in checking skills and no statistically significant changes in the use of physical skills or of problem- solving skills. The unchanging use of problem solving skills conflicts with findings from the case studies literature.

2.8 The identified gaps in the systematic literature review

This chapter identified the following gaps from the literatures that were reviewed.

Firstly, the teachers limited knowledge of certain technologies (Haydn, 2008) or preferred kind of technology (Marshal et. Al 2009) seems to determine the content of the teaching, thereby resulting in less integration of ICT in teaching and by extension less generic skills acquisition for pupils.

Secondly, Schools are getting equipped with similar technologies that are used in the industries, with the aim of equipping school pupils with relevant skills that are applicable in the industries and other work places. But the teachers' lack of operational and functional skills that is required for these equipment appears to be a challenge in demonstrating these skills in school. The effect of teachers' lack of knowledge, or limited knowledge of these industrial technologies has resulted in teachers' scepticism and avoidance of teaching with these equipment due to inadequate skills, which eventually challenges their confidence, competence and autonomy.

Thirdly, Basic skills are having little impact on the current expectations of skills relevant to the 21st century and as such what pupils can do which is an attribute of the 21st has replaced basic skills, thereby suggesting the need to formally identify and contextualise 21st C skills in the school curricular.

Fourthly, due to variations in sizes of organisations and resources, the work force does not prefer formal learning on the job since firms haven't got much time, and resources to fit classes into work pattern thus suggesting that basic generic skills are better studied at school than at work place.

Fifthly, there is low uptake on core skills at the secondary school level which suggests either its unpopularity or a reintroduction of its importance in schools and beyond. The lack of core skills has been blamed for the high rate of youth unemployment and as such the introduction of such skills in school teaching will be a more sustainable approach to reducing youth unemployment.

Sixthly, there is a mismatch between what is taught in school and what is expected in the world of work which indicates poor preparation of young persons for work from school.

Lastly, There is more emphasis on the impact of ICT on educational attainment rather than individual pupil need, low uptake on core skills at the secondary school level, youth unemployment traced to lack of core skills hence the importance introduction of such skills in school teachings for sustainability of the work force.

2.9 Methodological Limitations of Studies

Most of the studies that met the review criteria made more use of teachers' perspectives and opinion about the effectiveness of ICT in school than they would with pupils' perspectives. The 'student voice' (Ferguson, Hanreddy, and Draxton, 2011) in this regard was very minimal and was an identified gap which raises bias on such exclusion of an active stakeholder in education. There were more discursive papers reviewed under generic skills due to limited number of studies on generic skills in school. The few studies that met inclusion had more focus on employment and higher education sectors. As a result of this fact, it seems obvious that there is a lack of literature in the secondary education sector. The lack of literature also impacted on having a 'reliable evidence' (Bowman, Borlagdan and Bond, 2015) and systematic account on strategies that are

effective for young people's post school transition which could help in the long run on youth unemployment. This gap in literature suggested a need for an in-depth study in this area.

There were more quantitative studies (n=31) including international impact studies, carried out in comparison to qualitative study (n=21), experimental studies (n=3) and limited number of mixed method study (n=12). While quantitative studies had been known for the provision of evidence of relationship between the tested variables (Punch, 2013), they are limited because of the lack of in depth description of the participants' attitude and perceptions of ICT use in schools. The in depth studies as displayed in the qualitative studies generated a biased result as none of the study considered an in depth opinion and perspectives of the pupils necessary. This made the generalizability of such studies a thing of concern.

Another limitation in methodology of the studies reviewed was that none of the studies investigated the connection of the multi-dimensional nature of ICT with generic skills as it relates to post school transition, especially in the area of employment, since the hiring of school leavers is a recognised strategy in filling the skills gap in Scotland (Shury et al., 2014) and elsewhere. Besides, it is noted that employers' preference has been for older school leavers in the age group of 17-18yrs and an investigation into the generic skills acquisition of this age group will help employers make an informed decision. Furthermore, it will check the support in place and justify the government's decision on extended school years and whether or not this school year should have a unique curriculum or not.

It is also noted that most of the studies, examined a specific ICT in school, and most times with specific outcomes which cannot be generalised to most situations involving different types of ICTs. A holistic approach to review all ICTs in school across all subjects may provide specific skills that are associated with specific ICTs, thus leading to a more informed decision for pupils' post school destination.

2.10 Chapter summary and conclusion

The systematic literature review examined numerous research studies that relate to the use and relevance of ICT in education and also literatures that helped to clarify the definition of generic skills, its need and relevance in compulsory education as well as the work setting. Several scholars have researched on issues pertaining to ICT in relation to some of the external and internal influences responsible for ICT integration in the pupils learning process and the teacher professional development. These studies highlighted the difficulties encountered in embedding ICT in every school subject amidst the vagueness of policy directives and huge expenditure in that sector. While there have been studies justifying the expenditures in this sector, there hasn't been much evidence to show, as a connecting thread, on how the investment on ICTs in schools are meeting the individual needs of the pupils or will be and most importantly, the fulfilment of their future aspirations, which is the reason for schooling. On the other hand, the numerous studies and write ups on generic skills have been predominantly in the higher education and further education, and with study participants mostly from these sectors.

By implication, it gives the impression that generic skills acquisition is mostly relevant for HE and FE transition to the work place whereas pupils can also make transition from

schools to HE, FE and / or work and requires some forms of generic skills. However, the lack of empirical studies in the school sector regarding generic skills development, especially at the present time when the ubiquity of ICT in school is expected to lead to generic skills acquisition from its use, for impact on school transition, provides a rationale for this research. Furthermore, an explanation is needed for the actual role of ICT in advancing the acquisition or development of generic skills among secondary school pupils, as this further justifies the basis for the choice of the research topic.

The next chapter presents the methodology as well as methods employed in the empirical study.

CHAPTER THREE: METHODOLOGY

3.1 Introduction

This chapter provides a detailed description of the study design and methodology applied, including the rationale justifying the adopted methodological approach. It describes the data collection procedure, and instruments used in this study, highlighting their strengths and weaknesses and how best they have been utilised towards answering the research questions. There is a description of the sampling techniques used, the study setting, and a description of the participants involved in the study. This is closely followed by the general narrative of the data analysis and any ethical considerations. The procedure and the methods in the data collection and analysis are discussed under two distinctive phases- the quantitative and the qualitative phase.

The organisation of this chapter is in three sections. The first section discusses the following: the research design (which conceptualises the research topic), philosophical foundation of the study, the justification for adopting the exploratory mixed method design, and key assumptions of the study. The second section discusses the methodology for the study from the theoretical perspective with particular explanation of the philosophical underpinning of the study. The third and final section discusses the data collection procedure, instrumentation, validation, tools for analysing the data, and ethical considerations. These sections cover the two phases of the study (quantitative and qualitative phase).

Section One:

3.2 Research Design

As Bryman (2008) explains, a research design provides a methodical plan and procedure for data collection and analysis of a study. The decision on a research design to be adopted reflects 'the priority being given to a range of dimensions of the research process, starting from philosophical assumptions to data analysis (Tashakkori and Creswell, 2007). These include the importance attached to (a) expressing causal connections between variables; (b) generalising to larger groups of individuals than those actually forming part of the investigation; (c) understanding behaviour in its specific social context; and (d) having a temporal appreciation of the social phenomena and their interconnections" (Bryman, 2008, p. 31).

As little research has been conducted on this research topic (generic skills development among school pupils), this study is exploratory in nature. Rather than provide a conclusive answer, this study seeks to identify and explore key issues on generic skills development among school pupils, in varying depth, in order to provide a qualitative comparison of their perceptions on the effectiveness of policy and practices in schools for future research (Bell, 2010). This exploratory approach is considered suitable 'as a broad- ranging, purposive, systematic, prearranged undertaking' (Stebbins, 2001, p. 3) designed to maximize the discovery of generalizations. This study is concerned with the perceptions of teachers, pupils, and employers on the effective role of ICT in schools towards the development and support of transferable generic skills. Due to the current global contextual pressures, youth unemployment, new technologies and knowledge driven economy, schools in Scotland, as well as other developed countries, have been equipped

with ICT in a bid to prepare pupils for the knowledge society and fill the current associating skills gap. The knowledge society which is a new paradigm associated with technological innovation and service oriented society (Mansell, 2012), is a shift from the industrial period, where access to information and the capability to transfer information to knowledge is vital to the operations of the society. As stated by Afgan and Carvalho, (2010), pg 31. 'the knowledge society includes a dimension of social, cultural, economic, political and institutional transformation, and a more pluralistic and developmental perspective'.

As a result of this, there has been much emphasis placed on investments in ICT in schools with an expected outcome in generic skills attributes from such investment. However, there are less corresponding empirical studies investigating the effectiveness of ICT on generic skills development, especially in the secondary school sector, which is needed towards reducing youth unemployment and filling the associating skills gap. Presently, youth unemployment has been a recurrent topic in current debates locally (for instance, the 2012 house of commons debate on youth unemployment in the UK and the 2017 Scottish parliament debate with the minister for employment) and internationally (which includes the youth Guarantee scheme (2013), youth employment initiative (2013) 'Not in employment, education or training (NEET) as documented by Eurostat from 2012 through to 2015). In these debates and documentaries, youth unemployment has been associated with the lack of generic skills, and perceived as a major cause of the rise in youth unemployment (Lee, 2012).

The exploratory mixed method, employed in this study, aimed to assess the effectiveness of the CfE's policy on explicit use of ICT in Scottish schools. This approach is considered

useful as it aims to reveal more important data within the implementation process yet to be fully explored.

3.3 Research Methodology

Many researchers have defined the terms methodology and research methods. For example, Hart defines methodology as "…a system of methods and rules to facilitate the collection and analysis of data. It provides the starting point for choosing an approach made up of theories, ideas, concepts and definitions of the topic; therefore providing the basis of a critical activity consisting of making choices about the nature and character of the social world (assumptions). This should not be confused with the "techniques of research, and the application of methodology" (Hart, 2008, p.28). Swan and Pratt also define methodology as "the system of methods and principles used in a particular discipline or field of study or the branch of philosophy concerned with the methods of science".

Often times, the term 'methodology' is used rather confusingly, and in place of 'methods' (Swann and Pratt, 2003.). Swann and Pratt define method as "a way of doing something" (Swann and Pratt, 2003, p. 206) while Bryman defines research method as simply a technique for data collection involving specific instruments such as self-completion questionnaire or a structured interview schedule or participant observation whereby the researcher listens to and watches others" (Bryman, 2008, p.31). It could be distilled from these definitions above that methodology deals more with the philosophical traditions that govern research within a particular discipline, whereas research methods deals with the techniques for collecting and analysing data (i.e. how a particular research problem or

question is to be investigated and its outcomes analysed). With this background definition in mind, a look at the philosophical foundations of research becomes necessary.

3.4 Philosophical foundations of the research

Research in various disciplines can be generally situated in an intellectual or philosophical tradition such as positivism, interpretivism or constructivism and pragmatism (Punch, 2013). In a broad sense, positivism promotes the idea that "Scientific knowledge is derived from the accumulation of data obtained theory- free and value-free from observation. Anything that cannot be observed and thus in some way measured (that is quantified), is of little or no importance, or even in extreme versions of positivism, non–existent. Science is the pursuit of foundational knowledge (foundationalism). Foundationalism is the idea that certain facts are infallible and universally true, and so should provide the foundation upon which other ideas can be developed. Scientific method is applicable not only to the study of natural phenomena but also to human and social affairs" (Swann and Pratt, 2003 p.208). For examples, the ideas that 'causes produce corresponding effects', 'action and reaction are equal and opposite', 'sow and reap correspondingly' are considered as universally true and act as foundational knowledge upon which other ideas can be developed and inferences drawn. Researchers who proceed on the basis of foundational knowledge are often referred to as positivists, and they tend to disregard the non-scientific methods of inquiry. However, many scientists recognise the similarities between methods used in the natural and social sciences, but reject the positivist dogmatic conception of science (Swann and Pratt, 2003). These are often referred to as anti-positivist because of their common rejection of foundationalism, which is the view that human behaviour is

governed by general universal laws and characterised by underlying regularities (Swann and Pratt, 2003).

Social science research is regarded by the opponents of positivism as a subjective rather than an objective undertaking, and so provides an avenue for dealing with the direct experience of people in specific contexts. Therefore, the role of the social scientist is to understand, explain, and interpret social reality through the eyes of different participants whereby the participants themselves define social reality (Cohen, Manion and Morrison, 2011). Thus, the positivistic researcher is presented with daunting challenges in the contexts of classrooms and schools where the teaching, learning and human interactions are complex and strict scientific measurements may be inapplicable.

As an alternative to positivistic approaches, interpretivist approaches promote the following ideas: people are deliberate and creative in their actions and actively construct their social world; situations are dynamic and changing rather than fixed and static. Therefore, events and behaviour evolve over time and are duly influenced by context; Individuals and events are unique and largely non-generalizable; the social world should be studied in its natural state, without the intervention of, or manipulation by, the researcher; there are multiple interpretations of, and perspectives on, single events and situations; individuals interpret events, contexts and situations, and act on the basis of those events; and reality is complex and multi-layered. Therefore, many events are not reducible to simplistic interpretations; situations need to be examined through the eyes of participants rather than the researcher (Cohen, et. al, 2011).

The interpretivist researchers begin with individuals or groups as the object of their study, and set out to comprehend the individuals' interpretations of the world around them. Theory emerges from the specific situations and underpinned by the analysis of data generated through the research work. Therefore, from an interpretivist perspective foundationalism (which characterises positivism) tends to give way to multi-faceted meanings and understandings of human behaviour as diverse as the contexts and situations supporting them. The interpretivist researcher "is sensitive to contexts, uses various methods to get inside the ways others see the world, and is more concerned with achieving an empathic understanding than with testing laws of human behaviour" (Neuman 2003, p. 80). It also emphasises the importance of understanding the social world by examining its interpretation from participants' perspectives and how they construct meaning in natural settings (Bryman, 2012). The interpretivist paradigm involves the researcher working through a large amount of data encountered in the course of oral conversation like interviews or through questionnaires, and then finding meanings through the interpretation of the data (Cohen, et. al., 2011).

However, these interpretation can sometimes be misleading when over interpreted thus leading to 'epistemological violence' as described by Teo (2008, 2010), an interpretive speculation of data which can result to negative consequence for the participant as well as the researcher. Events that are happening around the time of data collection and analysis might influence the interpretation by the researcher, just as his value system may also interfere in the interpretations. This draws attention to a known limitation of interpretivism which challenges the 'scientific procedure' of verification, 'and therefore results cannot be generalised to other situations (Mack 2010, pg. 8)

A similar philosophical tradition to that of interpretivism is constructivism. Both traditions recognise that natural sciences and social sciences are fundamentally different in nature. While the natural sciences involve the study of physical entities, the social sciences deal with the study of social phenomena (human behaviour) which are not embodied in physical states. However, the constructivist view point about the nature of reality is that they are localised, specific, and constructed; they are based on experiences within a social context, and depend on the individuals or groups within that context (Punch, 2013). This view slightly differs with the interpretative view in the sense that the interpretivist view point promotes the idea that reality is rather complex and multi-layered, and therefore there are multiple interpretations and perspectives on single social events and situations.

Another philosophical tradition is pragmatism. Pragmatism, as Denscombe (2008) documents, is essentially practical rather than idealistic. The arguments of the pragmatist suggest that there may be various or multiple ways at arriving at the reality. This can be through subjective or objective means and some other times could require a combination of subjective and objective techniques. As recorded by Johnson and Onwuegbuzie (2004) the pragmatist is more concerned with applications that work towards answering a research question with a view to finding a solution to the problem, rather than the 'antecedent conditions' (Creswell, 2015 pg.10) suggested by the positivist. In the pragmatist view, the ability to answer the research questions and/or conclude the investigation is supported and achieved by employing different approaches, mixed methods of data collecting instruments and multiple instruments for analysis. However, these numerous approaches of data collection and analysis also form the basis for

criticisms of the pragmatist approach, as the feasibility of resources for collection and analysis of data throughout the duration of the research study can be a bit of an issue.

These different philosophical traditions have implications for the choice of research methods. Positivism is often associated with quantitative methods whereas either interpretivism or constructivism is associated with qualitative methods. Recently, there has been an increasing utilisation of qualitative research methods in mainstream education and social science researches. More recently is the increasing use of a combination of the qualitative and quantitative research methods in social science and education researches, often referred to as the mixed methods approach (Punch, 2013, Creswell and Plano Clark, 2011). According to Creswell and Plano Clark, (2011) a mixed method research design is a research design with philosophical assumptions as well as methods of inquiry. It involves philosophical assumptions that guide the entire study's data collection and analysis process, involving the mix of both quantitative and qualitative data. This means that the procedure for collecting, analysing and integrating both qualitative and quantitative data occurs within a single study with pragmatism as the paradigm.

Different scholars have different interpretations of the mixed method. For examples, Tashkkori and Teddlie (2003) argue that it is more appropriate to change the term 'Mixed method' to 'mixed model' for research. Their argument is that mix of approaches could extend beyond just the methodological approaches used. For instance, mixing of methodologies could occur across different disciplinary traditions (positivist/ interpretivism). Moreover, mixing within or across disciplines may raise many issues (Barbour, 1998). The argument raise the issue of clarification of what is being mixed and

how it is to be mixed. Potentially, mixed methods offer 'depth for qualitative understanding with the reach of quantitative techniques' (Fielding, 2012, pg. 1). In this research, mixing is about a sequential use of quantitative and qualitative approaches and their integration into a single analysis. The single objective of this approach is to achieve stronger validation of research results which in turn resulted in a better and more authentic inferences, conclusions and recommendation (De Lisle, 2011).

The mixed method strategy for dual and multiple approaches to data collection and analysis aims to neutralise the biases of either the qualitative method or the quantitative method, even though no one research process is without error or bias (Creswell, 2013). Thus, the mixed method approach is characterised by the merging of the quantitative study with qualitative study. The result from these two methods can either be combined to form a common data base for the study or alternatively be used 'side by side to reinforce each other' (Clark and Creswell, 2011). This may well serve as the reason for adopting a mixed method strategy - either to seek convergence across the qualitative and quantitative methods or to integrate and mix both. However, the mixed method research is not without criticisms and problems. The extensive data collection procedure involved and time consumed in collating and analysing an enormous amount of data has been highly criticised. This is because there are two different kinds of data to be collected - the quantitative (numeric) and the qualitative (textual) data. Another criticism lies in the actual procedure for the collection, which can either be in sequence or can run concurrently, thereby consuming more time (Ivankova and Creswell, 2009).

Tashakkori and Teddlie (2003b) identified over 40 different types of mixed methods in the literature which speak to the evolving nature of mixed method research. However, Creswell, Plano Clark, Gutmann and Hanson (2003) summarized these classifications which are now represented as four major types of mixed method. These four types includes- triangulation, embedded, explanatory and exploratory designs.

The triangulation design is best adopted when collecting different but complimentary data on the same topic (Fielding, 2012), with the aim of understanding the research problem. It also aims at bringing together the strengths of both the quantitative and the qualitative design in one phase, as has been recorded extensively in the literature (Brewer and Hunter, 1989, Greene, Caracelli and Graham, 1989, Morse, 1991). This design is best applied to compare and contrast the statistical results against the qualitative findings and also to validate it. A major challenge with the triangulation design is associated with the concurrent data collection which requires equal weighting and off course more effort. There are situations when the quantitative and qualitative data might not agree and in such a situation, the need for additional data collection becomes eminent. The judgement of whether to collect more of the quantitative data or qualitative data further adds to the challenge.

The embedded design is different from triangulation design. In this design where data sets are mixed from the design level, either as a one phase or two phase design, with one data set providing a supportive secondary role to the other (Caracelli and Greene, 1997). For instance, the researcher can embed qualitative data within a quantitative methodology. This design is particularly effective when within a large quantitative or qualitative study, there is a need to represent a quotation or a quantitative data. This might be due to lack of time or resources for an extensive data collection on both the quantitative and qualitative

data and as such priority is given to one. A major challenge with the embedded design is down to integration of the qualitative and quantitative design which can be difficult, particularly as the two methods are used to answer different research questions (Creswell, 2003).

The explanatory design often referred to as the sequential explanatory design, is a two phase mixed method design which involves quantitative data collection and analysis at the first phase and thereafter followed by a qualitative data collection and analysis before synthesis of both results. This design is quantitatively led and as such emphasis is placed on the result of the quantitative phase more than the qualitative phase. This model is often used when a quantitative findings requires some sort of explanations as to why 'an unexpected or extreme results occurred' (Ivankova, 2004). Although this model is considered as the most straightforward of all mixed method designs due to the clarity in what is being mixed, the lengthy times involved in collecting and analysing data twice seems to be challenging. In addition, these stages could also involve different research elements.

The exploratory design is similar to the explanatory design and is also referred to as an exploratory sequential design. As a two phase design, with one kind of data collected at any one time, the procedure and structures are straightforward to describe, and implement. The design emphasises on the qualitative aspect of the process rather than the quantitative, however, the inclusion of the quantitative component also makes the design acceptable to quantitative biased audience (Creswell and Piano Clark, 2007). A common challenge with this design is the amount of time that is involved in the collection and analysis of data at two different phases. This is also a shared challenge with the explanatory design due to its two phase design.

In each of these typologies explained above, there can be several variants with different combinations based on the emphasis and purpose for mixing (De Lisle, 2011, Morse and Neihaus, 2009). All the typologies, with the exception of the explanatory design, has a qualitative dominant variant, which is most applicable when capturing the complexities in educational and social issues (Creswell, Shope, Plano Clark and Green, 2006) and the nuances of the phenomenon that is investigated upon.

The mixed methods approach can either be transformative, concurrent or sequential. The transformative mixed method procedure adopts a 'theoretical lens or perspective' within a design that involves the handling of both qualitative and quantitative data. This then acts as a guide to data collection for both the quantitative and the qualitative methods. This 'lens' can either be in the form of gender, culture, race, ethnicity, lifestyle or social status (Creswell, 2013) The other type of mixed methods, called the concurrent mixed method involves a procedure where the researcher collects both quantitative and qualitative data at the same time and thereafter integrates the information to produce the result. In this type of research both the 'core and supplementary components' of the research is conducted at the same time (Morse and Niehaus, 2009).

The sequential design in this study, is made up of two distinctive phases. The procedure is such that the researcher continues his investigation from one method followed up with another method. This could mean starting off the data collection process with the quantitative methods, using instruments like the questionnaire and there after following up with the qualitative method in the form of a focused interview. The second phase usually builds on the emergent themes of the first phase and at the later stage of the

research gets synthesized and integrated together. The justification is usually that the quantitative data and analysis provides a general understanding of the research topic and questions and it becomes necessary for the second phase to 'refine the results emanating from the first phase by exploring in details at the second phase' (Ivankova and Creswell, 2009; Ivankova, Creswell, and Stick, 2006; Ivankova and Greer, 2015) This study fits into this type of mixed methods as it involves two different stages of exploring the research question through large amounts of generalizable data and individualised in-depth insights of the research question.

The sequential form of mixed methods approach is considered the best form for addressing the research questions and getting answers to the real aims of the study through employing both the positivist model as well as the interpretivist model. While the positivist model provides the platform for data collection, through quantitative means, the qualitative data provides the contextual data in relation to human behaviour and perceptions. The sequential mixed method design is adopted, within a pragmatic research paradigm with a sequential data collection method as the diagram below illustrates.

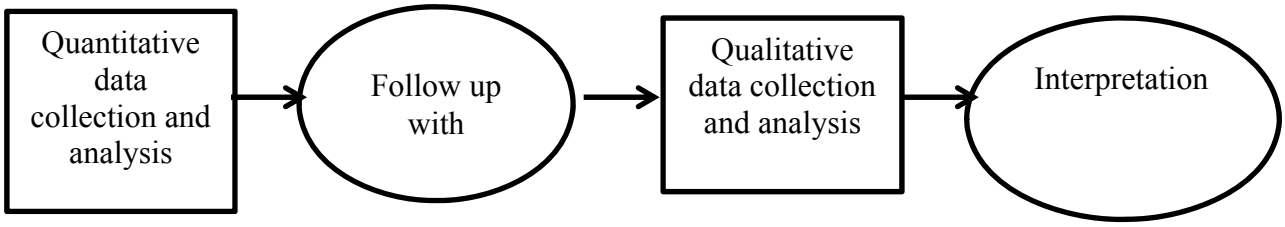

Figure 3. 7 Sequential Mixed Method Design

Source: Adapted from Ivankova, N., Creswell, J., and Stick, S. (2006).

As illustrated in the diagram above, data collection was in two phases. The study started the data collection process by collecting the first phase of data which is quantitative in nature (the questionnaire). These were collected from Secondary school year three to six pupils, secondary school teachers and selected employers that employ young school leavers. These sets of data were analysed in detail as later displayed in the sample section, commencing with the result from the first phase data set which informed the second data collection which is qualitative (interview), using a purposive sampling strategy. The Interview data was taken from teachers and pupils of the two sample schools that emerged from the analysis of the first phase of data collection. These were later analysed and interpreted. These schools were considered as having the best practice of using ICT more effectively and innovatively than the rest of the schools in the Council.

3.4.1 Justification for adopting the exploratory sequential mixed method design

According to Caruth (2013), the argument often cited as reason for adopting a mixed method design is to understand and address a complex problem. This is often accomplished through the combination of the quantitative and qualitative models in order to examine the objective and subjective aspects of the problem (Ponce and Pagan-Maldonado, 2015). The purpose of the design in most cases as noted by Mendlinger and Cwikel, 2008, is to have an in depth understanding of the problem, firstly by measuring its attributes and properties through a quantitative study, followed up with deep understanding of the problem through the qualitative study. It is an expectation that the research design addresses the research procedure starting from the philosophical assumptions to data analysis (Teddlie and Tashakkori, 2009). Therefore a research design will be considered ‘mixed’ if it employs the quantitative and qualitative approaches at any

stage of the research process, starting with the development of the research question, sampling strategies, data collection approaches, data analysis methods and conclusion (Creswell and Garrett, 2008). It is this integration that Teddlie and Tashakkori (2009) considers as the primary criterion for a mixed method design, although there are other typologies used in describing various mixed methods (De Lisle, 2011).

In this study, the exploratory sequential mixed method design (Creswell and Piano Clark, 2011) was adopted mainly due to the complexity in the educational phenomenon that is explored. An example of this complexity is the restricted nature of access to ICT for pupils and teachers in schools, which challenges the government policy and recommendation for an explicit permeation of ICT across all subjects. The government through the lunching of the CfE has recommended an explicit use of ICT in schools across all subjects (Scottish govt., 2013), thus suggesting a recognition to teachers' autonomy and encouraging teachers to use ICT in designing their unit lessons. However, the realities in schools suggests differently and reveals difficulty in carrying out this government directive due to restricted access to ICT in schools, in addition to increased teachers workload. Similarly, pupils who are expected to work with ICT in school in a bid for preparation for participation in the knowledge society have less exposure to ICT in schools to be able to develop generic skills from its use for post school transition Another example of the complexity, is the impact of teaching and learning with and through ICT in order to develop generic skill acquisition for post school destinations. These educational complexities were possible to identify and explain due to the quantitative and qualitative research designs that were component parts of the study, thus, revealing the strength of the mixed method design as outlined below

While the quantitative phase measured the objective aspect of the study which includes quantifying the number of teachers complying with the policy on teaching with ICT, the number of ICT applications used at school and the number of students with access to ICT at school, the qualitative phase illuminated the level of access to ICT, the relationship between ICT usage and generic skills development and most importantly captured the voices of active stakeholders in education (pupils and teachers) over the practicalities of the CfE in school and its impact on the actualization the pupils reasons for schooling.
The purpose necessitating a mixed method which often times include corroboration, expansion or initiation (Rossman and Wilson, 1985), must aim to answer the research questions fully – 'what are the stakeholder's perceptions on the role of ICT in developing and supporting generic skills among pupils in Scottish Secondary Schools?'. It is of great importance that a mixed method design has more to do with 'how well' the research purpose were addressed than 'how well' it matches any set of conventions (Howe and Eisenhardt, 1990). Furthermore, Howe and Eisenhardt (1990) emphasized that a good methodology should provide answers to the research questions, have a coherent background assumptions and finally, be applied well enough to yield a credible result.

In this study, the exploratory mixed method design was intentionally applied to integrate both the quantitative approach with the qualitative components at different points in the research process. As extensively documented (Caruth, 2013; Creswell, 2013; Ponce and Pagan-Maldonado, 2015; Teddlie and Tashakkori, 2009; Greene and Graham, 1989), the use of this approach can occur at any stage of the research process. The combination and integration of the research question at both the quantitative phase and the qualitative phase served as a guide through the research process and helped in illuminating the

complexity of the research problem. Similarly, the combination and integration of the result and the analysis also supports the earlier reason which was to address fully, the research question (Ponce and Pagan-Maldonado, 2015).

The aim of this in depth investigation was to evaluate the effectiveness of the government educational initiative of an explicit permeation of ICT in secondary schools teaching and learning. This initiative which has been accepted by schools is however being implemented on a developmental basis, with different start times at various schools. This exploratory study approach within a specific context, aimed to offer some explanation on the process and outcome of the curriculum implementation. It also allowed for the 'voice' of the stakeholders to be heard as a way of evaluating the curriculum through the perspectives of the 'beneficiaries' and the 'practitioners'. The exploratory sequential mixed method design is unique and different from other types of mixed method design which are also applicable to educational research.

While all typologies are exploring a contemporary phenomenon with the aim to illuminate the research problem for deeper understanding, this particular design is relevant to this context as there seems to be very little information known on the development of generic skills from the use of ICT at schools, particularly since after the government's recommendation on explicit use of ICT in schools. In fact, the missing pupils' voice in formulating the curriculum further justifies the adoption of this stance, which has necessitated a need for their perspectives in evaluating the contents of the curriculum, now that the curriculum has been implemented in schools. As the curriculum aims to guide the pupils all through school and to positive post school destination, it becomes imperative to get the perspectives of the pupils on their experiences and expectations from the curriculum and particularly on how it informs their post school destination choices.

The typologies of the mixed method, although with similar implicit rules, procedure (timing) and mixing criteria (weighting) has multiple variants based on emphasis and purpose as documented in the literature (De Lisle, 2011, Morse and Neihaus, 2009, Creswell and Piano Clark, 2011). These typologies include - the triangulated design which is used to obtain different but complementary data, the embedded design in which one data provides a supportive secondary role, the two phase explanatory design which builds or explains quantitative results and finally the exploratory design which is a two phased design with emphasis on the qualitative data (Creswell and Piano Clark 2011, De Lisle, 2011).

The focused interview was considered as a method for getting an in depth understanding of how the Curriculum for Excellence is being implemented in schools from the perspectives of the teachers and the pupils who are practitioners and beneficiaries respectively (Scottish Govt., 2013a). It particularly aims to evaluate the effective use of ICT in schools, and assess the strategies that is being adopted in schools towards meeting the individual needs of the pupil and the outcome of schooling.

This section has highlighted the justification for adopting the exploratory sequential mixed method, which was mainly aimed at illuminating the practicalities of the policy on explicit use of ICT in Scottish schools and the impact of such policy on pupils' post school destination. Further justification for the adoption of the exploratory mixed method study hinges on its appropriateness in addressing the research question fully as restated below.

3.5 Research Questions

After an extensive literature review, a major research question, 'what are the stakeholder's perceptions on the role of ICT in developing and supporting generic skills among pupils in Scottish Secondary Schools', was developed to guide this study. This question has further been broken down into three sub research questions as follow;

- What are the teacher's perceptions about the use of ICT in schools towards developing core generic skills?
- What are the pupils' perceptions on the ICT use in school towards generic skills development for post school transition?
- Do employers see a 'fit' between the acquired generic skills from school and the required employability skills for work and further education?

At this juncture, it is important to look at the applicable research methods employed in this study alongside other studies.

3.8. Ethical Considerations

Ethical considerations were employed to ensure that the participants are accorded the required level of respect as required by this research. The initial stages of the research and data protection for participants are guided by the University's ethical principles and code of practice for non-clinical research on human participants. This code makes it mandatory for the researcher to abide fully by its content before and during the lifetime of the research.

The first stage in this process was the submission of the University Research Ethics application form with all the instruments for collecting data for all phases of the study.

These include data collection instruments for the quantitative phase (phase 1) and qualitative phase (phase 2). These were scrutinized and approval was granted with UREC reference no 13126, in line with the 2013 University of Dundee, Research Ethics Council by the University Research Ethics Committee, (UREC), see Appendix B.

This study complied to and considered the respect of privacy and protection of the data provided by the respondents to the questionnaire as well as the interview sessions. The Ethical principles or considerations are the 'standard practices for privacy and confidentiality, protection of human subject participants' from the start of the study through to the 'participation and dissemination stages' until the final research findings are revealed (Lavrakas, 2008, p.243)

The next stage involved an application to the Scottish Criminal Records Bureau for an enhanced disclosure check now referred to as the 'Protecting Vulnerable Group Scheme' (PVG), to carry out this research which included participants classified under the Vulnerable Scheme Group. This scheme ensures that people (including researchers) who work with vulnerable groups (e.g. children) are suitable for any work involving this group. As the research involves visits to schools and interaction with pupils within Council A for data collection purposes, PVG approval for study was sought and granted. The approval came in the form of a certificate, detailing a clearance for no criminal convictions or records for the applicant (researcher). This certificate is presented on demand to the Head Teacher of each of the schools involved in the research. This method appears to be a standardised document for deciding on access approval into the schools or any other place where there are vulnerable children and adults. The PVG reveals an individual's convictions and other relevant information from the police. It also states whether or not an individual is disqualified from working with children in Scotland, England, Wales or

Northern Ireland or is currently on the list of those disqualified from working with vulnerable adults in England, Wales or Northern Ireland. However, it can be argued that the PVG can be a blanket cover, and does not guarantee thoroughness, since a PVG holder can also be a 'silent' paedophile or had even become a paedophile while having a valid PVG certificate (which usually is valid for 6 months). Therefore being in possession of a PVG might not necessarily mean that the holder is free from crime. Based on a successful PVG application, the researcher then sought for approval from the Educational Unit of one of the Councils in Scotland, with details of the research to be carried out and was granted. With these three vital approvals, the researcher was deemed fit to commence the data collection process.

The ethical issues that are prevalent in conducting research involving young people can be discussed under the following three distinctive areas namely, informed consent, confidentiality and data handling, and power relations.

3.6 Research Methods

Shuttleworth (2008) identifies three broad research methods for various research purposes as follows: experimental, opinion-based and observational research methods.

Experimental research methods deal with experiments, whereby quantitative independent variables are manipulated to generate statistically analysable data. Generally, the system of scientific measurement is based on interval / ratio variables. The experimental research method is what the positivists regard as real scientific research methods, because it fulfils all the definitions of 'true science', i.e. credibility (internal validity), dependability (reliability) transferability (external validity) and conformability (i.e. objectivity) (Bryman, 2008, p.34). Based on the experimental method, the researcher starts with a

known theory, and then establishes the hypothesis and the null hypothesis, and after testing the hypothesis accepts or rejects the null hypothesis. The data gathered by the experiment is then statistically analysed and thus generates clear research outcomes. On the down side, experimental research method could require more expensive and elaborate design for larger experiments, even though in some cases observation and transcription can be more costly. Where real-life organisms are involved, it might be impossible to perform the experiments in some jurisdictions because of ethical considerations.

Nevertheless, in other fields of study which sometime lack the luxury of quantifiable variables, different research methods are used. These other methods are expected to conform to the criterion of repeatability, although this is not always feasible in social science research because it deals with individual or group views, perceptions, opinions, etc. which sometimes are considered to be subjective.

Opinion-based research methods can also involve designing an experiment and collecting quantitative data. Questionnaires are an effective ways to collect quantitative data from a sample group that generate information with respect to participants' emotions or preferences. Opinion-based research methods, by definition, are normally used where emotions and behaviours are being measured. The advantages of this method are that it can provide an element of rating scale to opinion and emotion. On the downside, opinion-based research method is not as scientific as experimental research method but the results obtained through the former can be replicated (Shuttleworth, 2008)

Observational research methods mainly involve the observation of a phenomenon by the researcher with minimal interference, although in some cases the researcher initiates the

action. Observation is heavily used in social sciences, behavioural studies and anthropology as a means of studying a group without affecting their behaviour. This case study is an example of observational research methods. The experiment conducted based on this method cannot be replicated or falsified but can offer unique insights and will advance human knowledge (Shuttleworth, 2008). Observational research methods can also be useful when ethical issues are a major problem. However, Yin, (2013) explains that the choice of a research method may require going beyond the hierarchical stereotype as prescribed by Shuttleworth, and the choice should be based on three important conditions namely; the type of research question posed, the extent of control that a researcher has over the actual behavioural event and the degree of focus on contemporary as opposed to historical events (Yin, 2013).

According to Yin, the form of a research question can provide a clue regarding the appropriate research method to be used. In this study, the concern is on the teachers' and pupils' feelings and perceptions on the actual role of ICT in developing generic skills for work, higher education and living.

Due to the large areas of overlap among research methods, a choice among methods can result in deciphering the best method for addressing a research question. Histories are the preferred method when there is no control or access to behavioural events. The historical method deals mainly with the past, although histories can be done about contemporary events as well. However, in some situations, e.g. participant-observation, informal manipulation can occur. Contrary to the historical method, the case study methods can use two sources of evidence such as direct observation of the events being studied and interviews of the participants involved with the event (Yin, 2013). In the case of

experiments, e.g. in a laboratory setting, an investigator can manipulate behaviour directly and systematically. However, the full scope of experimental science includes social experiments (e.g. observational studies) whereby the investigator cannot manipulate behaviour and still the logic of experimental design is applicable. For instance, field trial designs, often used in observational studies tend to mimic the design of laboratory experiments. The foregoing would suggest that there are overlaps among the research methods, and in some situations two or more methods might be considered equally appropriate.

3.7. Key Assumptions of this Study

The basic assumption of this study as derived from the literature review is that developing and supporting core generic skills in secondary schools using ICT is dependent on the variables contained in table 3.2 below. The data collection process employed addresses the sub-research questions by using these particular instruments to gather information about these particular elements as contained in the table.

The sub-research questions are restated below:

- What are the teacher's perceptions about the use of ICT in schools towards developing core generic skills?
- What are the pupils' perceptions on the use of ICT towards generic skills development in practice?
- Do employers see a 'fit' between the acquired generic skills from school and the required transitional skills for work?

The first six variables (1-6) in table 3.2 above relates to sub-research question 1; the next three variables (7-11) were derived from sub-research question 2; while the twelfth variable to the thirteenth (12-13) relates to the sub- question 3. This goes to confirm that Questionnaires and interviews are the instruments for collecting data for a mixed methods study (Bryan, 2008

Table 3. 5: Independent variables and instruments used for data collection

S/N	Variables	Teacher interview	Teacher questionnaire	Pupil Questionnaire	Pupil Interview	Employer questionnaire
1	Teacher perception on impact of ICT on generic skills acquisition	•	•			
2	Teacher ICT Competency	•	•			
3	Teacher actual ICT use in classrooms	•	•			
4	Teacher perception on alignment of curriculum with generic skills development	•				
5	Teacher computer use outside the classroom	•	•			
6	Teacher openness to change	•	•			
7	Pupils' perception on impact of ICT on generic skills acquisition			•	•	
8	Pupils' perception on acquired generic skills for transition to HE, FE, and or work			•	•	
9	Pupil actual ICT use in classrooms			•	•	
10	Pupil computer use outside the classroom			•	•	
11	Pupil openness to change				•	
12	Employers' expectations of potential employees generic skills base					•
13	Employers' perceptions of school effectiveness on skills transitions					•

Source: Adapted from Bryman, 2000

3.9 Informed Consent

This aspect of the research process ensures that the researcher approaches with strict carefulness and respect for the participants involved. Informed consent is a valid consent whereby sufficient information about the research is given to the participant, to enable the participant to make free and informed decision on participation (Creswell, 2013). This process ensures that there is no explicit or implicit coercion of the participant (ESRC, 2012), and consent is usually in written form. This allows the participant enough time to go through the details of the research before accepting to participate or not.

In this study, the participants were informed about the developmental phases of the study and the details of each phase through an information sheet (see Appendix E, H, and J respectively) and the consent letter (see appendix G, D, and K respectively). The information sheet presented to each participant contains the procedure, level of participation required, and guarantee of the confidentiality of the participant and the right to withdraw from participating at any desired time. Details of the level of participation for the different phases were explained in the research project information sheet given to each participant (see appendix E, H, and J respectively). The first phase of the study requires participant's involvement in filling out the self-administered questionnaire or the online version of the questionnaire, while the second phase involves participation in an audio recorded interview. Both phases are voluntary.

There are three groups of participants involved in the first phase of the study, namely the pupils, teachers, and selected employers. Participants for the phase one of the study are secondary 3 to secondary 6 pupils, who are within the ages of 13-18years referred to as

children and young people (CYP) by the National Children's Bureau (NCB) guidelines (Scally, 2014). This group of pupils were given the written consent form for their participation. They have the option to take the consent form home in order to seek approval from their parents in addition to their decision to participate, before the actual questionnaire administration. For the rest of the three groups, the consent letters was administered along with the information sheets and the questionnaires. The consent letter emphasised that participation was purely voluntary and that data will be stored in a secured cabinet in the researcher's room. It also informed the participant of their right to withdraw at any time of the study. All participant groups were assured of the purpose of data collection, which is solely for this study and assured that their information would not be made available for any other studies. This is in line with the Data Protection Act of 1998. Participants were also informed that data will be made public by the time the thesis is published, though without individual or personalised details of the participants. The actual questionnaires also had provision for the participants to indicate participation in the second phase (which was purely qualitative).

The second phase of the study had two sets of participants namely the teachers and secondary 6 pupils. Contacts were established through different routes. For the teachers, contact was made directly through the email supplied on the questionnaire completed in the first phase of study and thereafter date, time and venue is agreed. For the pupils, the process for consent starts off with an email to the technology teacher who acts as the co-ordinator and as a middle- person between the researcher and the pupils, in term of providing the logistics required from the school. Further arrangement with the venue for the interview is provided by the co-ordinators in the participating schools. To assist the

coordinators in the logistics and planning for the interview, the researcher also sends in a list of pupils who indicated interest in participating, through the questionnaire administered in the first phase of the study, for participation in the second phase of the study. A consent letter is sent out to these set of secondary 6 pupils to take home for their parents' approval to continue with the study or not. Where the participant decides not to participate, informed consent at that point becomes informed refusal (Cohen et. al. 2011) and this decision is respected and upheld.

3.10. Confidentiality and Data handling

Data for this study were saved in the University of Dundee's secured password protected computers in the research room. The audio recordings were also stored safely in the computers. The data will be destroyed a year after completion of the PhD program and publication of any emerging article from the study. This information was clearly communicated to the study participant prior to their participation.

3.11. Children and young people's participation in research

Studies involving children and young people has witnessed a significant growth in interest by scholars (Alderson and Morrow, 2011; Hill, 2005; Barnes, 2012, Howarth, 2010, Jobe and Gorin, 2012, Farrell, 2005), particularly in the areas of ethics and childhood studies, Bijleveld, Dedding and Bunders- Aelen, 2013. In order to clarify the ambiguity surrounding the definition of a child and the young person, there is globally as in the UK, a clear distinction between 'the child' and 'an adult' with some legislative rights accorded respectively. Globally, most countries are guided by the definition of a child as given by the UN Conventions on the rights of the child. The UNCRC defines the 'child' as

‘everyone under the age of 18 unless, "under the law applicable to the child, majority is attained earlier’ (United Nation Assembly for Human Rights, 1989). This convention had further ratification in the UK and had made provision specifically for the child. In the UK, there are several laws that specify age limit in different circumstances. For instance in the areas of child protection, in the UK, the age of consent is 16 years old, and the age for criminal responsibility is 10 years in England, wales and Northern Ireland respectively and 8 years for Scotland (NSPCC, 2015). This suggests that the legal age is contested in the UK. The National children’s Bureau (NCB) 1989 guidelines adopts the term ‘children and young person’ (CYP) when addressing the 0-18 year old age group and explicitly makes a distinction between ‘children’ and ‘young persons’. While ‘children’ represent the age group of 16 years and below, ‘young person’ represents the age group of 16 -18 years. This distinction in age by the NSPCC is an adopted view in different parts of the UK, as every region has its own distinct legal age. In this study, these two age groups are involved (13-18yrs) hence, the adoption of the term children and young person.

The complexities surrounding studies involving young people has been extensively documented (Scally, 2014, Kearns, 2014, Alderson and Morrow, 2011, Furlong, 2016, Symonette, 2009 and Ruspini, 2016). In the past decade, a common attitude displayed in studies involving young people suggests that they should ‘be seen and not heard’ (Scally, 2014). This perception was partly due to the assumptions that data collected from young people were unreliable and invalid (Kirk, 2007). Furthermore, researchers then were of the assumptions that young people couldn’t distinguish between fantasy and reality (Punch, 2009). This assumption is based on the sociocultural perception of the child as ‘vulnerable, in need of adult protection and lacking understanding of what participation entails’ (Bijleveld, et. al, 2013,). This is also extended to the perceptions held about young

people as being too immature to understand the world around them, thus resulting in the belief that young person account is immature (Barnes, 2012, Pinkney, 2011)

More recently, research studies involving children and young people have realised the importance of children and young people's voices, as they are now seen as active agents unlike some decades ago when young people were assumed to be passive objects of research (Hill, 2005). However, increase in the literatures on childhood and young people's voices has also evidenced the importance of pupils' opinion. The United Nations Convention on the Rights of the child (UNCRC) highlights the respect and support for children and young people. Article 12 of the United Nations Convention on the Rights of the Child (UNCRC) specifically refers to a child's right to have their views heard on matters affecting them, and to have their views taken seriously. These articles places the child and young person at the centre of affairs affecting their wellbeing, with some levels of authority and responsibility. However, it failed to specify the exact roles and responsibilities. Article 3 particularly states that 'In all actions concerning children … the best interests of the child shall be a primary consideration (UNCRC, 1989). This, however suggests that in addition to the young person being an active participant in the research process, the researcher must negotiate with the young person, as a social actor in the research project from the start of the research process through till the end of the research process. This approach has proved to be beneficial as it ensures that the participation of the young person remains voluntary and in the best interest of the young person at every given stage of the research. This is further explained in Article 13 which highlights that children have the right to express themselves in any way they wish – not limited to the verbal expressions used by adults but inclusive of their own language for a proper conversation (UNCRC, Geneva, 1989). This legal backing on active participation of

children in research has been evident in Scotland since the devolution of powers and is still the current practice

Policy framework for children and young people in Scotland

Following the devolution of government in UK by 1997, the Scotland Act of 1998 was established and charged with making Scotland responsible for their own legislatures, policy and practice in education. This Act gives the Scottish parliament, the legislative powers over education matters in Scotland, with the education (Scotland) Act of 1980 as the principal legislation governing education in Scotland.

In the UK there is a growing area of research which identifies the impact of pupils' rights in decision making particularly on decisions that affects them. And for these reasons, there are several legislations and government policies guiding children and young people's services. In Scotland in particular, there are legislations, policies and guidelines for children services (Scottish government, 2014). Some of these dates back to pre-devolution of legislative powers days and had continued through to post devolution days. The children's (Scotland) Act of 1995 provides a legislative framework for the child protection system in Scotland. It makes provisions, responsibilities as well as rights of parents, the duties and powers of the public authorities who are rendering support to the child and also the time within which such interventions could be made in a crisis. The Protected Vulnerable Group (PVG) Act of 2007 sets out measures for scrutinizing adults working with children and young people, in order to ensure that unsuitable adults are not in contact with children. The Children and young People's Act of 2014 builds on all the framework for early years and particularly places the child and young persons at the central of every planning, decision making and support for the young person.

In Scotland, there are several legislatures that guide the services and involvement of children and young persons. The 'Getting It Right for Every Child' (GIRFEC, 2016), which is underpinned by the UN Convention on the Rights of the Child (UNCRC, 1989), the Children's and young people (Scotland) Act (2014), and the Curriculum for Excellence (CfE, 2010), etc., are some of the policies and legislation in the area of childhood and young peoples practice. Following on from the GIRFEC is the 'My world triangle' which is a model aimed at identifying the strength and weaknesses surrounding the child or young person world. Professionals like social workers and teachers use this model to systematically assess and identify the needs and the skills possessed by the young person. These information is utilised for post school transition into higher education or work (apprenticeship). The particular benefit of the 'My world triangle' model, is that the identified areas of strength and interest can further be developed to booster the confidence levels of the young person which would impact positively on his future aspiration. This implies that the support for the wellbeing of the young person is carried out in partnerships with parents and social services.

In addition, there is the Early Years Framework of 2008 which focuses on prevention and early intervention of children and young person in crisis. This is carried out over a 10 year plan within which the outcome for children aged 0-8 years would have improved. Other guidelines include, 'Equally Well' which focuses on health inequalities and Achieving our Potential which also focuses on poverty and income inequality (Scottish Government, 2008).

Although these regulations particularly addresses the involvement of the young person in research, it does not prescribe explicitly in law, the extent and magnitude of participation of the child or young people during their participation (Skelton, 2008). This then suggests

that children and young people occupy a position of strength and competence, hence the important consideration given to their opinion. However, there can be situations where the young persons' position may be perceived to have been compromised, due to the inevitable involvement of some other personnel who are either superior in age and status. These situations and their possible impact on consent are discussed in the next sub-section.

3.11.1 Power imbalance and its impact on informed consent

Power imbalance is not new in research, particularly in research involving children and young people as this have been documented extensively (Punch, 2013, Hill, 2006, Christensen and Prout, 2005, Symonette and Kearns, 2014). As Symonette (2009) recorded, power in research involving children and young person is perceived from the stand point of age, size, and status of the researcher. The recognition of adult centeredness in our society and the unequal power levels that exists between the young person and the adult, can either impact on consent sought for participation or the actual participation of the young person, thereby alluding to perceived coercion.

As Heath, Brooks, Cleaver, and Ireland (2009) remarks, power and status differentials can often times make it impossible for the young person not to dissent or disagree, (or even not to respond contrary to the opinion of the researcher (Hill, 2005). As the researcher is an adult, who is in a position of authority over children, likewise any adult present in the research loop, e.g, teacher or head teacher, their presence may suggest a power and status differentials which can have a negative impact on the process. The vulnerable and less powerful position of the young person may also mean that the choices and decision of others are embedded in the research process (Ryan, 2010). The impact of power

differential in research involving children and young person is a shared challenge among researchers. For instance, the outcome of the initial interaction between the researcher, who is an outsider researcher and the 'gate keepers', (head teacher and teachers) who are entrusted to look after the pupils in the school, may not represent the opinion and interest of the pupils. Furthermore, these 'gate keepers' may be blocking a worthwhile study that is aimed at improving policy and practice in the school, by declining the request of the researcher for school participation. Similarly, the 'gate keepers' can also preselect the pupils for interview based on their own perspectives of the study or institutional interest and not the pupils' interest. Whereas if there was a direct access to the pupils, the outcome may be different. These situations can have direct impact on consent, whether informed or voluntary consent (Gray and Webb, 2010) and the whole research process, and can suggest a perceived coercion.

In my study, there were situations that could have led to implied coercion due to the involvement of the head teacher and the ICT coordinators who provided the logistics for ease of data collection. These logistics includes location for data collection exercise, namely, computer laboratory for the online survey participation in the first phase of the study and a quiet office for the interview sessions for the second phase of the study. The contact with these school authorities were inevitable, as an outsider researcher, however, it was managed at two levels with regard to consent. Firstly, by making sure that these adults were not present either in the computer lab or in the interview room where data was being collected. Secondly by having a consent page as the first page on the online survey, explicitly explaining that the participant has the right to withdraw at any point, without

any explanation. This page further explains that by putting a tick in a box confirms that the participant has read the information and has consented to participation.

As a result of this double handling on consent, a relatively small number of participants (two persons) did not continue with the participation, as consent was sought for the second time on the day of the actual interview. This strategy helped to manage the impact of the 'gate keepers' (Alderson and Morrow, 2011) on pupils' consent and participation. Gate keepers are inevitable in most data collection involving children and can sometimes act against the good intentions and benefits of a research through their legal responsibility of protecting the children (Christensen and Prout, 2005). They can also delay the research process or frustrate the researcher by non-cooperation. So for these reasons, their position needs to be acknowledged by working with them in a subtle way while maintaining the conditions for the granted informed consent of the participants. In compliance with the approval granted by Council A for school participation in my study, the information protocol was given to the head teacher for information, consent, approval and subsequently, for the provision of the required logistics for carrying out the data collection exercise from pupils and teachers from the school. As there were no identified ethical issues and concern regarding the study protocol as recorded in the information sheet and questions to be administered, the required logistics which included, quiet room for interview and computer laboratory for online questionnaire were then provided by the head teacher.

Section Two: Procedure

3.12 Sampling and Sampling technique

Sampling is an important aspect of a research and it determines to a large extent the success and appropriateness of the research (Cohen, Manion and Morrison 2011). There are typically two major types of sampling involved in either qualitative or quantitative study. These are the probability (random sampling) and non-probability (purposive) sampling. While the probability sample is drawn from a wider population at random with the high chances of getting the larger population represented and less risk of bias, the non-probability targets a particular group which may not necessarily represent the entire population of the study. The probability sample consists of different types, namely- simple random samples, systematic samples, stratified samples, stage samples and multi-phase samples. These probability samples share one thing in common which is that they have generalizability and randomness built into them (Creswell, 2013).

It is established that in mixed method research more than one kind of sample is applied, i.e. probability and non-probability sampling as well as samples of different sizes, scope and size (Teddlie and Tashakori, 2009, Cohen et al, 2011). Quantitative techniques differ from qualitative techniques in some distinct ways (Punch, 2009). While the qualitative research makes use of a much smaller sample size, the quantitative makes use of a bigger sample size. This is significant because while the qualitative research is more concerned with 'reflecting the diversity in a given situation, the quantitative research gives priority to statistical generalizability or representativeness' (Barbour 2001, p.115).

The sampling technique for this study incorporates the previously established idea that a mixture of positivistic and interpretivist approaches will produce a credible set of data that would help address the research questions. Consequently, a mixed method of quantitative and qualitative research was chosen. Correspondingly, the research design incorporates the mixed research method and the same goes for the sampling technique. In this study, the first phase which made use of questionnaire for data collection, represents the probability sampling which involves a larger sample size and thereby representative of the entire population, whereas the second part comprising of interviews would represent non-probability sampling whereby a smaller sample size is required. Different sampling strategies were employed at the two phases and are hereby explained fully below.

3.12.1 The sampling strategy

This investigation on the effectiveness of ICT on generic skills development among school pupils was carried out in all eight secondary schools in Council A, in Scotland. The first part of the mixed method sequence, dealing with the quantitative data, was employed at the first phase. Sampling was based in Council A because of the need for cost-effectiveness and the need to obtain relatively easier access to the eight public secondary schools in the area. This phase adopted the convenience sampling for the location of the study area and a random sampling technique for questionnaire administration. It is important that the sample is representative of the population, thereby ensuring that all members of the population have equal chances to be in the sample (Morse and Niehaus 2009). The convenience sampling and the random sampling techniques are types of non-probability sampling. Other kinds of the non-probability sampling includes the quota sampling, purposive sampling, dimensional sampling, snowball sampling, volunteer and

theoretical sampling. (Cohen, Manion and Morrison 2011; Creswell, 2009; Sarantakos, 1998).

The second phase adopted a purposive sampling technique, to increase the diversity in the sample for a varied response. Invitations were sent out to all teachers and secondary 6 pupils in the two sample schools and 18 teachers and 20 pupils in total participated. The selection of these two cohorts of participants out of the total three cohort were considered beneficial to the aims of the study as well as the research design. With the CfE as a driver to this study, coupled with the implementation of the explicit use of ICT in school across all subject areas, these two stakeholders (teachers and pupils) were considered as core central to the study, as practitioners and beneficiaries of the government policy on ICT in Scottish schools, while the employers were peripheral and exploratory to the entire study. These teachers and pupils, who are also members of the emerged sample schools, were considered for an in-depth study (interview) for these reasons, although the first phase offered the opportunity for an exploratory questionnaire and a preliminary scoping of the employers. Other factors which were considered in the selection of the sample for this study are explained below.

3.13 The Selection Criteria

One of the key drivers to this study was the omission of the pupils' voices in the 2002 debate on education in Scotland which arrived at some key decisions that affects the pupils, as active stakeholders in education. This background firstly informed the selection of the participants of this study to be pupils from schools. Furthermore, the recommendation by the Scottish Curriculum for Excellence document (Scottish Executive, 2008, BTC3, p. 15) for the introduction of life skills from secondary 3 was

used as a guide for the selection of the age group (14 -18 years) which was used as sample size for this study. The age group for this study which comprises of secondary 3 to secondary 6 pupils in all schools also includes their teachers. Based on the directives of the government policy and the CfE on the permeation of ICT in all subjects, all teachers (regardless of the subject that they teach) were involved. An important government document on the destination of school leavers from Council A provided guidance on the decision regarding the organisations selected for the employers' questionnaire administration. Specifically the first five organisations with the highest acceptance of school leavers were considered for the employer questionnaire administration. A closer look at the criteria for selecting the schools suggests a similar systematic approach in identifying the sample schools for the second phase of qualitative data collection.

Analysis of the returned pupil questionnaires (n= 1364) and teacher questionnaires (n=64) from the quantitative phase, revealed a significant difference in the response rate from schools in the urban and rural parts of Council A respectively. It also highlighted some differences in the responses by the participating schools regarding the implementation of the CfE in the respective schools, although the implementation had been on a developmental basis, with all schools fully on the new curriculum.

Other consideration that led to the selection of these schools for an in depth study occurred during my visit to the participating schools at the first phase of data collection and was later confirmed from the analyses of the questionnaires. The first sample school had significant activities carried out through ICT which are considered as 'best practice' of ICT within and beyond the school and which aligns with the objectives of this study. It

also had a significant number of students on Council A's work programme, being the first set to be accepted by the Council as illustrated in the table below.

The table below summarises the criteria considered for the selection of the two schools out of the eight schools that participated in the quantitative phase.

Table 3. 6: Selection criteria for sample schools.

	Schools							
Criteria	**Urban**				**Rural**			
School Identity	**1**	**2**	**3**	**4**	**5**	**6**	**7**	**8**
Permission granted	•	•	•	•	•	•	•	•
Response rate to questionnaire	**80%**	**50%**	**48%**	**42%**	**65%**	**84%**	**67%**	**92%**
Number of Inter disciplinary project with ICT	**3**	**2**	**2**	**3**	**2**	**4**	**4**	**4**
International collaboration through ICT	•		-	-	-	-	-	-
Business engagement with school	•	•	•	-	-	•	•	•
Total number of Council A Work program slots	**5**	**4**	**4**	**5**	**6**	**3**	**5**	**6**

Innovative use of ICT	•	•	•	•	•	•	•	•
Team building challenges	•	•	•	•	•	•	•	•
Global language exchange	•	-	-	-	-	-	-	•
Total number of foundation apprenticeship awards	**8**	**3**	**6**	**5**	**5**	**6**	**6**	**12**
Number of extended work placement with council A	**3**	**-**	**-**	**-**	**2**	**2**	**2**	**3**

- School Identity = 1,2,3,4,5,6,7, and 8

From the table above, the justification for selecting the two sample schools are as follows: The highest response rate was recorded from the sample schools labelled 1 and 8, located in the urban and rural sectors of Council A respectively and interestingly too, the only two sample schools involved in global language exchange. These two schools also had the highest number of apprenticeships award from the council which was aimed at enhancing the generic skill capability of the pupils, while only sample school 1 engaged in international collaboration.

3.14 Research Population

For the purposes of this research work, some group of participants have been classified as constituting the research population. These groups of participants' are the major stakeholders in the educational system in Scotland. They are namely:

- The secondary school pupils who are both the consumers and beneficiaries of ICT in schools,
- the secondary school teachers who make use of ICT in schools for teaching and are agents of change,
- The employers who engage the school leavers in employment as one of the positive destination from school.

The figure below further demonstrates:

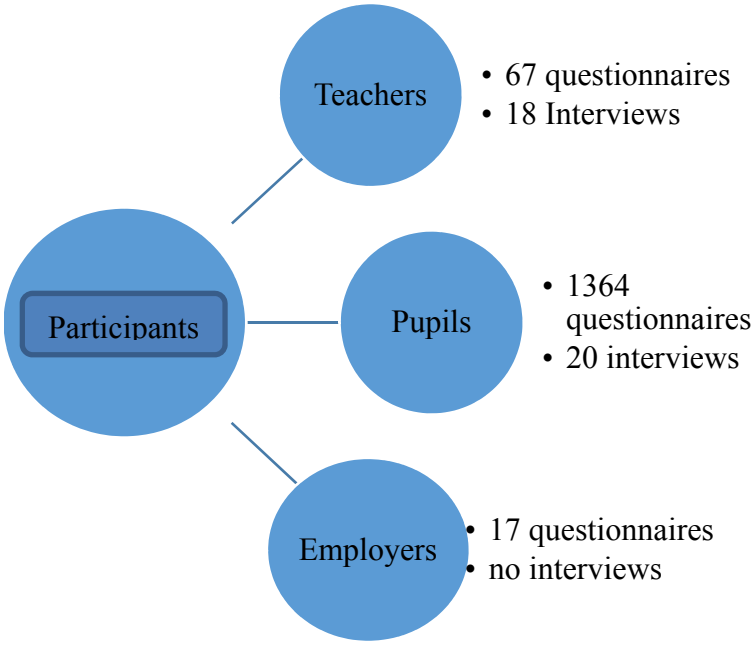

Figure3. 8 study participants

In order to achieve a possible full response for the study, a self-administered questionnaire was put in place for data collection and administered to these groups. A more easily accessible version of the same questionnaire, in the form of an online questionnaire, was also devised for this study using the Bristol Online Service, to adapt to the anticipated difficulties that may arise in the course of administration and collection of questionnaires. It also enables the researcher to obtain wider participants' responses.

3.15. School Access

Council A was approached for their approval to visit all the secondary schools in the Council for research purposes and an approval was granted after due diligence process. Following the approval by the Council, the head teachers of the distinctive schools were contacted via email for their individual approvals and to arrange a convenient time for the school visits. This was followed by an informal visit by the researcher to agree on the modalities and procedure for the administration of the questionnaires both for pupils and teachers and thereafter followed by the actual administration and collation through an organised method agreed upon with the head teacher with minimal disruption to school activities to school activities. The head teachers were given the information sheet which explained the details of the data collection and the level of expected participation from the teachers and pupils by the researcher.

3.15.1 Demographics of the sample schools.

School Demographics. Sample school 1: (School ID 1)

Sample school 1 (SS1) is a mixed sex secondary school which is located along the coastal line of council A and is approximately about 15.4 miles from the centre of Council A. SS1

has been in existence since the late 1970s. The school handbook acknowledges that there has been a consistent vision of the school on broadening the horizons of pupils from inception till date, particularly its vision of positive post school skills which accounts for the high number of students combining school with work. This vision is shared by this current study whose emphasis is on generic skills from ICT use, applicable to post school destinations. It has a staff strength of 100 teaching staff and 1021 pupils, which comprises of 613 upper secondary school pupils (S3 –S6). The school is notable for its chronology of successful exam records, particularly, achieving more than double the average for the number of pupils attaining five or more awards in Highers. The school ethos emphasizes on education and life skills that the young person can utilise for the future.

The school's wide range of activities in the community aimed at equipping pupils with life skills for their future aspiration beyond secondary school dates back to the 90's when the school had its first work experience within the community, working closely with businesses and industries. Presently, the school work in harmony with the wider community and stakeholders, to ensure that young people realise their full potential and make the best possible contribution to the local community in particular, and the society in general. Some of the schools established project link with the community include Rotary club, Developing youth project, and Leadership project.

As a lead school in national projects on IT and science, the Curriculum for Excellence, and Transformative innovations, it had an extended link internationally with a USA based university on an ICT leadership project aimed at developing and sustaining generic skills among its pupils in the transitional classes. A typical learning period in the school starts from 08.55 through till 15.40 with lunch period in between at 13.00-14.00. There is also the tutor group time slot from 10.35 – 11.05.

As recorded by the school magazine (which has been anonymised), all young people from S1 to S3 have a fully oriented path as designed by the CfE and also engage in interdisciplinary projects which connects their learning subjects to specific projects in order to develop transferable skills. At the senior classes of S4-S6 where there are more intensive decisions on subject choice, the pupils continue to develop more life skills through enthusiastic participation by choice, within the community. The tables below is a record of the participant in the sample school

Table 3. 7: Pupil demographics for sample school 1

Participant identifying code	**Class**	**Gender**	**Nationality**
SS1-P1	S6	M	**British**
SS1-P2	S6	F	**British**
SS1-P3	S6	M	**British**
SS1-P4	S6	F	**British**
SS1-P5	S6	F	**British**
SS1-P6	S6	F	**Indian**
SS1-P7	S6	F	**British**
SS1-P8	S6	M	**Chinese**
SS1-P9	S6	M	**Chinese**
SS1-P10	S6	F	**African**

- SS =Sample School, P=Pupil, M= male, and F= Female.

The table above reveals that there were four male participants and six female participants for the in depth study in sample school 1. Among these pupil participants, were two Chinese, three British and one African and Indian pupil respectively.

Table 3. 8: Teacher Demographic information for sample school 1.

Participant identifying code	**Age range**	**Gender**	**Teaching Subject and role**	**Years of service**	**Class levels taught**
SS1-T1	30 - 39	**F**	Biology	**5**	S3 –S6
SS1-T2	20 - 29	**F**	Computing	**3**	All Levels
SS1-T3	20 - 29	**M**	Physics	**1**	S3 – S6
SS1-T4	20 - 29	**F**	Biology	**2**	All Levels
SS1-T5	50 - 59	**M**	Computing	**20**	S3 – S6
SS1-T6	30 - 39	**F**	Biology	**10**	All Levels
SS1-T7	30 - 39	**F**	Music	**5**	S1 – S3
SS1-T8	20 - 29	**F**	Music / Musical Art	**6**	All Levels
SS1-T9	40 - 49	**F**	Principal teacher for technical subjects	**12**	All levels

- SS= Sample School, T= Teacher, M=Male, F= Female

From the table above, there seems to be a versatility of subjects taught by the participating teachers and interestingly too cutting across all year groups.

School Demographics of Sample school 2 (School ID 8).

SS2 is a non-denominational mixed sex secondary school located in the rural part of Council A, approximately 12.1 miles from centre of Council A. It has about 497 pupils and a staff strength of 50. It is established in the late 1420's and has distinguished history of being a cathedral choir school which has evolved to become modern school at present times.

The pupils in this school are known for supporting the local community and a good number of pupils in transitional classes of S5 and S6 combine work with schooling. This may have been accountable for the 95% average of school leavers entering positive destination, such as higher education, college and apprenticeship (work placement) as recorded by the school magazine which has been anonymised.

The school works in partnership with local businesses to develop a construction centre as part of their approach to Developing the Young Workforce. The senior phase of S3-S6 engage more in activities within their local communities and these include Duke of Edinburgh Award, ASDAN, Personal Development Awards, Employability Skills, Volunteering etc. – these being delivered by school staff and partners within the local and wider community.

Table 3. 9 : Pupils demographic on sample school 2 (School ID 8).

Participant identifying code	Class	Gender	Nationality
SS2-P11	S6	M	British
SS2-P12	S6	M	British
SS2-P13	S6	F	British
SS2-P14	S6	F	British
SS2-P15	S6	M	British
SS2-P16	S6	M	British
SS2-P17	S6	F	British
SS2-P18	S6	F	British
SS2-P19	S6	M	British
SS2-P20	S6	M	British

- SS= Sample School, P= Pupil, M= Male and F= Female.

The table above reveals an all British pupil participants, comprising of six male participant and four female participants within the same class year.

Table 3. 10: Teacher demographic information for sample school 2.

Participant identifying code	Age range	Gender	Teaching Subject and role	Years of service	Class levels taught

SS2-T10	30 - 39	**F**	Chemistry, Biology and Science	**7**	All levels
SS2-T11	40 - 49	**M**	History and geography	**12**	S3 – S6
SS2-T12	30 - 39	**F**	Art and Design	**14**	S1 – S3
SS2-T13	30 - 39	**F**	English and Principal teacher on support for learning	**12**	All Levels
SS2-T14	30 - 39	**F**	English	**8**	All Levels
SS2-T15	20 - 29	**M**	Maths	**4**	All Levels
SS2-T16	30 - 39	**F**	Modern Language, German and French	**9**	S3 – S6
SS2-T17	30 - 39	**F**	Home Economics	**8**	S1 – S3
SS2-T18	20 - 29	**M**	Computing teacher	**5**	All Levels

- SS=Sample School, T=Teacher, M=Male, F=Female

The table above reveals six male and four female teacher participant, mostly with long years of service. These teachers are involved in delivering teaching across all school years and teaches various subjects.

Section Three: Instrumentation

3.16 Pilot Study

As a way of minimizing errors, a pilot study was conducted in one of the schools in Council A, where the main study was carried out. This was done in other to test the instruments for collecting data. 25 pupils from secondary 3 to secondary 6 participated in the pilot study with 8 teachers including one deputy head teacher of the school. Among the participating teachers were computing teachers (2), Arts and design teacher (1), English teacher (2), principal teacher for technical subjects (1), biology teacher (1), and lastly, music teacher (1) The breakdown of the demographic for the pupil participants are displayed in the table below.

Table 3. 11: Participants, profile in the pilot study

Pupils participants	
Age	13-15 (11) 16 -18 (14)
Gender	Male (20) Female (5)
Class	S3 (8) S4 (2) S5 (10) S6 (5)

Feedback from Pilot study

Feedback from the pilot studies helped to minimize errors from the questionnaire, while at the same time validating the questionnaire and also the final structure of the questionnaire before administration. Specifically, some comments were considered very important as they touched on the structure of the questionnaire.

Firstly, the comments on completion time, due to long sentences. This was reviewed and accommodated in the final questionnaire. The pupils mentioned that there were too many questions and some long sentences which made the understanding of the questions difficult and impacted on the completion time.

Secondly, the pupils indicated a preference to the Likert scale response style, where pupils prefer the text format of 'strongly agree' to number ranking of 1-5, as it was easier to interpret and understand.

Thirdly, the teachers mentioned that the questions on Curriculum for Excellence were better addressed to teachers only as the pupils are not in the best position to comment on the difference or effectiveness of the CfE and its expected outcome.

Fourthly, other comments were around clarity of language, structure and presentation. An important comment was on the succinct nature of the participant information page without much detailed information on the recruitment process especially on the involvement of the ICT coordinator in the circulation and collation of the pupils' questionnaire. This was perceived as coercion because the presence of the teacher could affect the behaviour and decision of the pupils. Fifthly, there were comments on the adoption of a mixed mode of strategy for questionnaire administration as it will help reach a wider audience (Bryan, 2008). As a follow through, a web based questionnaire was created and implemented. Lastly, the lack of freedom for the pupils to say more by

the exclusion of word ‘other’ as an option in the multiple answer question was also raised and considered a valid comment as the descriptive part of the questionnaire will further enrich the data.

The main study instrument:

The quantitative instrument for the study was constructed using the research questions for the study as a guide and collected through self-administered questionnaires and online questionnaire for adaptability and convenience (Cohen et.al, 2011). The qualitative interview questions were designed from emerging issues from the questionnaires in the first phase. As there were two sequential phases in the study, a total of three sets of questionnaire were administered to the three cohorts of participants in the first phase. Pupil questionnaires comprised of fourteen questions developed around the research question and sub research questions and then divided into three sections as follows –

The first section is about the pupils’ personal details, while the second section focused on the pupil’s ICT use and skills acquisition. The third section focused on the pupils’ perception of the effectiveness of ICT in schools for their destination after school. The teacher questionnaire comprised of 16 questions and divided into three sections similar to the pupils’ questionnaire. The first section is about the teachers’ personal details and role in school, followed by the second section which is about the teachers’ ICT use in school and finally, the third and last section focusing on teachers’ perceptions of ICT in education. The questionnaire used was prepared using some of the ideas and issues that flagged up during the literature review and then adapted to the questionnaire style used in a study by Awang (2012).

The last questionnaire used in the study was the employer questionnaire. This was also developed from the research question and adapted to the UKCES 2009 survey. This questionnaire has three sections as well like the pupils and teachers respectively. The first section requires employers' personal information and role in the organisation, while the second section is about employer use of ICT and the last section is about employers' perceptions of the ICT in education.

3.17 Quantitative phase (Phase 1)

The quantitative phase was marked with the administration and collection of questionnaires. The questions included in the questionnaire were influenced by the literature review, and from findings from previous researches and Scottish government policy analysis on ICT in schools. Three groups of participants were involved with the questionnaire completion- namely the pupils, the teacher, and the employers. The questionnaire was administered in all the schools in Council A (8 schools) involving 1364 pupils and 64 teachers on completion and also 6 employment organisations involving 17 staff in total. There was a choice of self-administered questionnaire and an electronically fielded online questionnaire (Bryman, 2012) for flexibility and convenience. In circumstances where the respondents were located in a specific institution or organisation, (like the employment sector) it became necessary for the researcher to make visits to the institution or organisation in person with the questionnaires and subsequently discuss the option of an online completion in addition to the self-administered questionnaire. The three cohorts of participants involved in this first phase (quantitative phase) are hereby discussed in detail.

3.17.1 Pupil Questionnaire

The questionnaire employed for this study contains14 items, organised in three sections (see Appendix f). Section one contains general information about the study for consent of the respondents, while section two contains the demographics of the respondents. These demographics include the age range of 13-14, 14-15, 15-16, 16-17 and 17-18 respectively. It also includes the class, which comprises of four levels- S3, S4, S5, and S6 respectively, gender, and school spanning across eight schools in total, represented as School ID 1,2,3,4,5,6,7,and 8 respectively. Section three contains questions on pupils' ICT access and use (home and school), pupils' skills level which is across five levels, namely Non-existent, beginners, intermediate, advanced, and expert level. These levels are represented on a scale of 1-5 where level 1is the least and represents non-existent level and level 5 is the most, representing expert level. Section three also includes ICT applications learnt in school, questions about how skills were gained, individual use of ICT, and frequency of use. In addition, it contains questions on ICT perceptions of pupils in education.

Two versions of the questionnaire were used namely the self- completion and online questionnaire which were aimed at collecting data on the following variables as shown in the pupil questionnaire as shown in appendix F, namely pupils' perception on impact of ICT on generic skills acquisition, pupils' perception on actual ICT use in classrooms, pupils' computer use outside the classroom, pupils' openness to change, pupils' acquired skills relevance to school transition and pupils' perception on school transition to work, further education and employment. The questionnaire administration was adapted to suit the purpose by being administered both online and face to face in order to increase the response rate and to support the pragmatic approach to the study. In some schools where

it was possible for the electronic version of the questionnaire to be filled, the ICT teacher provided access to the computer lab since that was the only feasible place for an online questionnaire to be completed. The timing for use of the computer lab was considered to be first thing in the morning after assembly to avoid disruption to the rest of the school activities or at the end of a unit lesson in the computing lab. The pupils, having already consented on paper to fill out the online questionnaire will again be prompted on the first page of the online questionnaire to either withdraw their participation or consent to participate by putting in a tick after reading the study's information.

A unique system was adopted in the delivery and collection of the face to face questionnaires. The questionnaire was dropped off with the head teachers, who in turn contacted the ICT co-ordinators of their respective schools to assist in the provision of the computer lab and for distribution to the pupils. After completion, the pupils handed the questionnaire at the school reception as advised and thereafter, the researcher was contacted for an agreed date of collection, while the response for the online questionnaire was directly received by the researcher through the Bristol Online Survey service. The pupils in S5 and S6 who were over 16 years of age, were encouraged to fill the questionnaires in school as there was not a need for parental consent, but only their individual consent. For the rest of the age group under 16 years of age, which were mostly in the S3 and S4 classes, a parental consent as well as theirs was necessary in line with the ethics approval for the study and this meant that they had to take the questionnaires home to their parents for consent before filling out the questionnaires the next day. The proposal to administer questionnaires in all eight schools (using the mixed modes) was based on the need to satisfy the generalizability and validity criteria for this study and to ensure a relatively higher number of respondents.

3.17.2 Teacher Questionnaire

The teacher questionnaire is similar to the pupil questionnaire in terms of structure, layout, and also in the administration (see appendix I). It contains 14 questions, spread across 3 sections. Section one deals with the demographic information of the participants. These include, age, years of teaching, teaching subject information and lastly qualification. Section 2 contains multiple response questions on teachers' use of ICT, single response question on classroom use and frequency, computer access (home and school), computer skills level of participants, computer skills gain route and lastly the reasons for using ICT in class. The last section – section 3 is a Likert scale question type which asks about the perceptions towards ICT in education. It has a scale from 1 to 5 where 1 represents strongly agree, 2- agree, 3- neutral, 4 - disagree and 5 represents strongly disagree. Overall the questionnaire has four open questions and 12 closed questions and these were administered among teachers within the sample group with the aim to collect data on the following variables as shown in appendix I: teacher perception on impact of ICT on generic skills acquisition, teacher ICT competency, teacher perception on actual ICT use in classrooms, teacher computer use outside the classroom, and teachers' openness to change.

Self- completion questionnaires (or self- administered questionnaires) required the respondents to answer questions posed by the researcher by completing the questionnaires themselves. For relative ease of access to the questionnaire and an expected high response rate, the researcher was adaptive and had an electronic version of the same questionnaire. So, the teachers had a choice of filling out the questionnaire online or in hard copies.

3.17.3 Employer Questionnaire

The employer questionnaire adopted a similar style to the pupils and the teacher questionnaire but however consisted of 16 questions across 3 sections. Overall, there were 6 open questions and 10 closed questions. While section 1 deals with personal details in the form of age, years of service, Section 2 deals with access (home and work), academic qualification and role in organization. The final section, section 3 contains questions on the types of application used, reason for use, and general perception on ICT use. Questionnaires were administered mainly among organisations that recruit young school leavers in Scotland. A Scottish Government document (2013) on destination of school leavers from Council A provided the basis for the selection of the employers and recruiters approached for the questionnaire completion. This document suggested an increased percentage in the positive destination of the young school leavers with employment as the third highest positive destination. Some of the categories fielded include, engineering, retail, sales and marketing, administration and management, and tourism. Others include Banks, IT solution offices, and academic institutions. Personnel managers in these organisations were approached as the target respondents because it is believed that they are in the best position to comment on the generic skills possessed by the young school leaver in their respective organisations. The aim is to assess whether or not, the reason behind the hiring of the young school leaver has been realised or not. In these organisations where the questionnaires were distributed, a similar style of delivery and collection to the pupil questionnaires was adopted. The personnel managers of the participating companies recruited the respondents of the questionnaires themselves within their respective organisation. The respondents were mainly managers or personnel who

work with young school leavers directly or who have interface with young school leavers in their respective roles at work. This typical sample school approach to recruitment and selection of participants accounted for the small number of respondent within this group and as such the generalizability of their responses will be limited and accepted with caution.

3.17.4. Data Analysis

The data analysis was unique to the different phases of data collection stages as expected in a mixed method study. Questionnaire data, having been collected at this phase, were analysed using the IBM statistical package for social sciences (SPSS) version 21. This analysis included the descriptive analysis, and correlation analysis. The descriptive analysis helped to state the frequency and percentages of the questionnaire responses as well as the overall response rate. The questionnaire has 14 questions and contains both 11 closed questions and 3 open ended questions. In analysing the questionnaires, it is recognised that the questionnaire data were ordinal and as such were transformed to facilitate the use of parametric statistical technique for comparison between the three cohorts or participants. This method helps to check if there are any significant differences between the three cohorts of participants – pupils, teachers and employers.

The survey which was carried out in Council A in Scotland involved secondary 3-6 pupils of the eight secondary schools in that Council, their teachers and the employers that engage young school leavers in the local Council area. There were three sets of questionnaires with each aimed at having answers respectively, for one out of the three research questions. Each of the research questions were targeted to a group of respondent – pupils, teachers and employers respectively and the questions were tailored to suit the

purpose of getting the right information to answer the research question. These survey results are displayed separately in the next chapter, in this order- the pupils' questionnaire, the teachers' questionnaire and the employers' questionnaires. The closed questions were analysed using the descriptive analysis while the open questions were analysed using the thematic content analysis.

Descriptive statistics were used to describe the basic characteristics of the study in order to answer specific research question. The questionnaire which consists of a total of five sections namely – (a) acknowledgement and consent, (b) personal details, (c) access and use of ICT, (d) skills gain and (e) perceptions of ICT in education, examined a brief account of the demographics or personal details at first instance and were analysed to ascertain the respondents ease to access, skills level, perception of the usefulness of ICT and an assessment of the types of ICTs that they have learnt to use in school. The personal details were coded with numbers I through to 2, where 1 represents ages 13-15 and 2 represents ages 16 – 18. The skills levels were coded as numbers 1 through to 5, with number 1 representing non-existent (meaning that there are no computing skills at all). Number 2 represents beginner's level. This level is marked with the identification and familiarisation of the keyboard, and a basic working knowledge of how to use it. Number 3 represents intermediate skills level. This level has a working knowledge of the computer with an average computing skills fit for processing information. Number 4 represents the expert level stage which is marked with the mastery of most functionality of the computer including programming. There were narrative data from the questionnaire and these were analysed manually.

Correlation analysis was applied to investigate the relationship between the variables. The analysis focused on the strength, the significance level and the implication of the

correlation. There were five criteria for determining the result of the correlation analysis and strength (r-value). As noted by Field (2013), a correlation analysis could be very strong (0.70 or higher), strong (0.40 to 0.69), moderate (0.30 to 0.39), weak (0.20 to 0.29) and very weak (0.01 to 0.19).

A correlation analysis was applied to check the relationship of the following variables:

- Pupils home access and School access
- Pupils ICT skills levels and ICT home access
- Pupils' skills level and ICT school access
- ICT use in school and work skills learning at school
- Pupils' perceptions of the importance of ICT and skills development for outside school use

3.18. Qualitative (Phase 2)

The participants were coded using a 'participant identifying code of 'T1' to 'T18' representing teacher no 1 to teacher no 18 (as the total number of participated teachers) while the emerging themes were discussed in close link to the interview questions which has been coded as 'IQ1' representing interview question one, all through to IQ8 representing interview question 8. Similarly, the pupil participant, were coded P1 to P20 for the first to the last pupil.

3.17.1 Interview structure and design

The interview design was a semi-structured type with open-ended questions to provide more flexibility for both the researcher to ask extra questions and for the participant to offer more information (Kvale and Brinkmann 2009). The questions asked in the interview were aimed at the research questions. To elicit their spontaneous views, teachers were asked very general questions (i.e. general views on 'ICT for all outcomes' in all subjects as proposed by the Scottish Curriculum for Excellence), before being introduced to the research themes (i.e. teachers autonomy, teachers confidence and competence level, delivery strategies and best practices, policy compliance and impact on teachers role, skills development impact and facilitation, assessment and evaluation measures and finally, challenges and obstacles on generic skills development.

The interview technique adopted the purposive sampling technique. Two schools were selected from Council A as the two sample school schools. These schools have been selected due to their high response rate in the questionnaires administration, and best practices of ICT use and generic skills in Council A. while one of the schools have a high proportion (12) of its upper secondary class pupils combining work with studies, the other have an established global connection relationship with an academy in the USA and uses ICT innovatively to teach generic skills through video conferencing and flipped classroom. Therefore best practice in this context refers to innovative ways that ICT is being used in these schools in order to bring about developed generic skills which can be utilized at post school destinations of work, higher education or living.

This criterion was adopted based on Marshall and Rossman's (2014) four criteria for purposive sampling as follows: There should be a high probability of the presence of a rich mix of the processes, people, programs, interactions and structures of interest ease of entry (i.e. accessibility); the existence of the phenomenon under investigation; and the likelihood that the researcher will be able to build rapport with the research participants (Marshal and Rossman 2014).

The teachers that were targeted for interview were chosen to get an in depth first-hand account of the effectiveness of the ICT they use in school and also to find out how that can fulfil a specific purpose of generic skills development for the pupils. The teachers were all involved in the use of ICT as it permeates all subjects, although most of the participants were either ICT teachers, or business studies teacher's, or as a support staff within a school's ICT suite. Others include the computer science teachers and ICT coordinators.

The main purpose for conducting an interview was to get insightful information from the pupils and teachers as direct users of ICT, and to ascertain to what extent their exposure and usage has impacted and prepared pupils for their post school destinations. As the teachers and pupils were central to my study as key stake holders, the data collected and analysed at the first phase of study suggested an in-depth conversation through interview. The impression of key stakeholder was derived from the policy document on education in secondary curriculum which recommended the explicit use of ICT in school with the teacher as the practitioner and the pupil as the beneficiary. This is different from the employer's cohort, where the descriptive data collected was adequate and no interview was considered necessary.

There are several advantages and disadvantages in using the interview instrument in collecting these data and these are summarised below.

Advantages

It allows teachers to describe in their own words, and in a relaxed comfortable environment, what is meaningful or important to them rather than being restricted to predetermined questions.

- It provides high credibility and face validity.
- It allows room for the interviewer to probe and ensure that teachers are interpreting the questions appropriately.
- It allows the researcher to adapt the questions as necessary, clarify doubts and ensure that responses are properly understood
- It is suitable for discussing complex issues and clarifying them because the researcher is present.
- It also provides the interviewer the opportunity to apply expertise and interpersonal skills to explore interesting themes.

Having stated the advantages of the interview techniques, there are also some disadvantages associated with the interview technique.

Disadvantages

- Some of the respondents of the interview may be uneasy about being interviewed and the anonymity of their responses.

- It can be more reactive to personalities, moods, and interpersonal dynamics between the interviewer and the respondents.
- The analysis and interpretation of a qualitative interview is time consuming.
- It may also be considered as inconvenient to teachers as some of them may find it difficult to create time for the interview amongst their busy school and classroom schedules.

3.71.2 Teacher Interview

The interview data for teachers came from the analysis of the questionnaire result from the first phase of study. These include the open ended questions of the questionnaire aimed at an in-depth understanding of the research question as well as gather specific information. These result were in turn used to draft the interview protocol for teachers

3.17.3 Pupils interview

Similarly, the pupil interviews consist of the open ended questions from the questionnaire used in the first phase of the study. It also includes the teased out analysis from the whole questionnaire with the aim for further clarifications on the answer to the research question.

3.17.4 Data Analysis

The interview process is an iterative procedure hence its unique qualitative style of analysis (Creswell 2003a; Denzin and Lincoln 2003a). The individual interviews with teachers had eight semi structured questions whereas the pupils' interview questions were six in total (see appendix M). The responses to these questions were analysed using Nvivo 10 and presented using the Miles and Huberman's interactive model (1994). The Miles and Huberman's interactive model is a four stage model for qualitative data analysis. The process commenced with the coding of data after collection, followed by the cleaning of data referred to as data reduction. This stage involved identifying and grouping of similar themes, clusters and pattern. The third stage follows with the display of data represented with charts and graphs and lastly was the verification and conclusion stage. This stage is dependent on the data reduction and the display can be in the form of a chart. This process has been illustrated by figure 3.9 below.

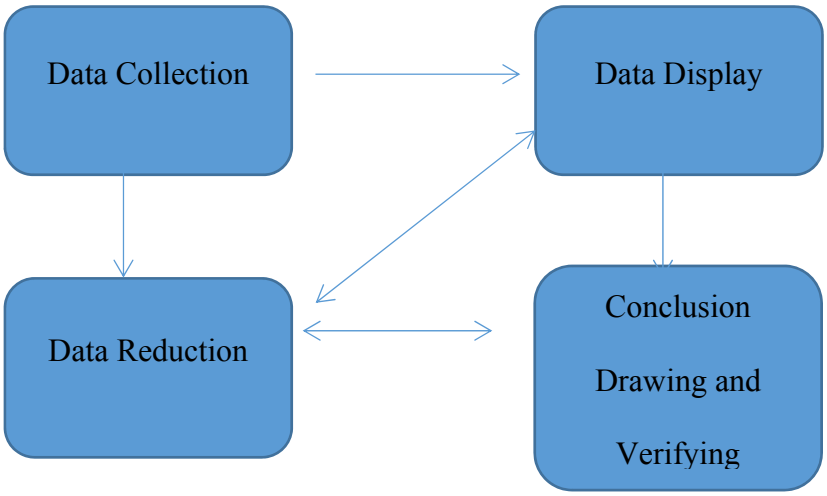

Figure 3.9 Miles and Huberman's framework

Source: Punch, K.F (2009) Introduction to research methods in education.

The interview data analysis procedure started with the transcription by the researcher, which involved typing the recorded interview data out, then followed by the coding procedure. The coding was done through a combination of 'in vivo' code (the actual words from the interviewee's statement), the collation of statements and cluster codes, leading to an inferred meaning from the code. The codes were filtered down to form themes. There were qualifying statements justifying how the codes and themes were arrived at and these statements are represented in table 4.28, of chapter 4. Four of the most salient statements (responses) were selected for each question to justify the codes and demonstrate how the tables work.

The individual interview with teachers had eight semi structured questions whereas the pupils' interview questions were six in total. The responses to these questions were analysed using Nvivo 10 and the Miles and Huberman's interactive model which is a four stage model for qualitative data analysis. The process commenced with the coding of data after collection, followed by the cleaning of data referred to as data reduction. This stage involved identifying and grouping of similar themes, clusters and pattern. The third stage followed with the display of data represented with charts and graphs and lastly was the verification and conclusion stage. This stage is dependent on the data reduction and display.

The participants were coded using a 'participating identifying code of 'T1' to 'T18' representing teacher no 1 to teacher no 18 (as the total number of participated teachers) while the emerging themes were discussed in close link to the interview questions which has been coded as 'IQ1' representing interview question one, all through to 1Q8 representing interview question 8 .

3.17.5 Reliability and Trustworthiness

Reliability in qualitative research is often questioned especially by the positivist researchers (Cohen et. al, 2011) who see it as an attribute of quantitative research design (Golafshani, 2003). Although this is debatable, some authors (Descombe, 2008) consider it a necessary step in a qualitative design because it reinforces the confidence in the research result by involving another researcher to cross check the result. In order to ensure that the procedure employed in the interview in this study was thorough and the handling of the data was free from bias, the researcher adopted some of the proposed strategies by Creswell (2007) to ensure the trustworthiness of the data collected. The transcripts of randomly selected interview data were given to peers for assessment and review. In return, the results were compared and contrasted against each other, with the sole aim of addressing researchers' bias, ensuring that the participants' opinions has been well represented and improving credibility of the result (Newby, 2010). To further ensure trustworthiness in this study, the researcher, from the onset applied some systematic procedure by making use of the questionnaire result to formulate the interview questions. The next step adopted was the involvement of peers in the assessment of the questions in order to check for the appropriateness of the questions to the target audience. This was eventually followed up by the actual conduct of the interview. After interview, came the collation of the result and the transcription of the interview recordings. This stage involved a peer review by two academics, whose reviews were compared against each other for accuracy and confirmability. As Shenton (2004) explained, this process will maintain credibility while addressing bias.

3.18 Chapter summary

This chapter has explained the research design of this study and most importantly, shown a significant distinction between the three major philosophical underpinnings of research. As a mixed method study, it has through a systematic procedure developed and applied the research instruments for collecting and analysing quantitative and qualitative data. These instruments were piloted to pupils and teachers of one school with similar qualities and characteristics as the main study participants before final administration. Adopting a pragmatic approach, the quantitative data collection was carried out online through Bristol Online survey and also through face to face administration.

The sequential method (Cohen, et. al., 2011) was adopted in the study at two phases, on participants' perceptions of ICT in school, towards generic skills development which can be transferred to post school destinations. A total of 1364 pupils, 64 teachers and 17 employers respectively completed the first phase while 18 teachers and 20 pupils respectively participated in the second phase, for a data collection process which lasted for nine months (from Jan 2014 – June, 2014, September 2014 – December, 2013). These data were analysed using IBM SPSS version 21 and Nvivo 10 software respectively for the two phases. The analysis of the first phase data comprises of descriptive analysis, correlation analysis, cross tabulation analysis and one way ANOVA. The descriptive analyses were used to show the basic features of the study responses, like the response ratio, percentages, and frequency, while the correlation analysis was used to show the relationship as well as the differences in the data collected at the first phase. Thematic

analysis was applied to the data collected at the second phase out of which some randomly selected transcripts were peer reviewed to avoid subjectivity and bias.

The result of the empirical study is presented in the next chapter.

CHAPTER FOUR: RESULTS

4.1 Introduction

This chapter presents the result of the questionnaire data collected from the three cohorts of participants referred to as stakeholders as explained in the previous chapter (methodology). These stakeholders are the pupils, teachers and employers who are directly or indirectly involved with education. The pupils are the beneficiaries of education, with the teachers as the facilitators of education and change while the employers are involved in the engagement of the school leavers.

These stakeholders completed different questionnaires. The questionnaire was aimed at collecting generalizable data, exploring the perceptions of all three cohorts of participants on the effectiveness of the ICTs in secondary schools toward generic skills development for post-secondary school transition. The questionnaire also aims to establish a foundation on which to extend the research, to examine in more depth through interview, stakeholders perceptions on generic skills development from ICTs in schools. Data collected through questionnaires are reported separately in three sections in this chapter and provide information and further explanations to the research questions while the full discussion will be in the next chapter (chapter 5).

The research questions are restated here-

- What are the pupils' perceptions on the use of ICT in school towards developing generic skills for post school transitions?
- What are the teachers' perceptions on the explicit role of ICT in teaching towards developing generic skills among pupils?

- Do employers see a ‘fit’ between the acquired generic skills from school and the required employability skills for work?

Each of these research questions are presented to a cohort of participants- pupils, teachers and employers and the responses of these participants are hereby reported separately in the various sections of this chapter.

Section One: Quantitative results

4.2 Pupil Questionnaire Result

Descriptive statistics of the fourteen items used in the pupils' questionnaires are presented in the result below. These results are organised and discussed under six sub headings

- Demographics of respondents
- Access, usage and skills gain in schools
- Pupils computer skills
- Pupil skill gain
- Reasons for using ICT
- Pupils' perceptions of ICT in schools towards generic skills development.

4.2.1 Demographics of respondents

The demographic information of respondents (pupils) included age, class, gender and school as displayed in table 4.12 below. It shows the frequencies and percentages in participation in the questionnaire and highlights the differences in the number of responses. The analysis is mainly descriptive. Overall, 1364 pupils participated in the questionnaire out of a corpus population of 3518 comprising of secondary 3 – 6 year groups of eight schools in one local council area in Scotland. The survey had more male respondents than female, with the highest number of respondents within the 13-15 age range, which is associated with secondary 3 to 4 school year. At these classes (S3 and S4), life skills has just been introduced as directed by the CfE, which has improved pupils access to ICT in school.

Table 4. 12: **Pupils Descriptive statistics**

Variable	**Category**	**Frequency**	**Percent**
Age	13-15	715	52
	16-18	648	47
Gender	Male	701	51
	Female	663	49
Class	S3	384	28
	S4	282	21
	S5	340	25
	S6	358	26
School*	ID 1	162	12
	ID 2	134	10
	ID 3	216	16
	ID 4	181	13
	ID 5	135	10
	ID 6	106	8
	ID 7	147	11
	ID 8	283	21

*= school identification number

This table reveals a difference in the number of respondents from school year S3 where the highest number of participants was recorded and school year S4 which had the least no of participants. The data suggests an overall response rate to the survey to be 39% out of the corpus population of 3518. The highest response rate was recorded in school ID 8 while the least number of respondents were from school ID 6. These two schools are situated within the rural and urban parts of Council A.

The next sub section will cover the analysis of the main questions in the questionnaire.

4.2.2 Access, Usage and ICT skills Gain in school.

The pupils were asked about their ICT access at home and school. The aim of this question was to establish the percentage of pupils with access to computer either at home and school, those with no access at school and home and thereafter establish if there is a relationship or not between access and skills level on one hand and usage and skills development on the other hand.

Figure. 4.10 Shows a high percentage of respondent to home access to ICT, with an average of 95% of respondents with access at home and 93% at school respectively. The data below imply that only 7% of the pupils are without access to computers at school and 5% of them do not have access at home.

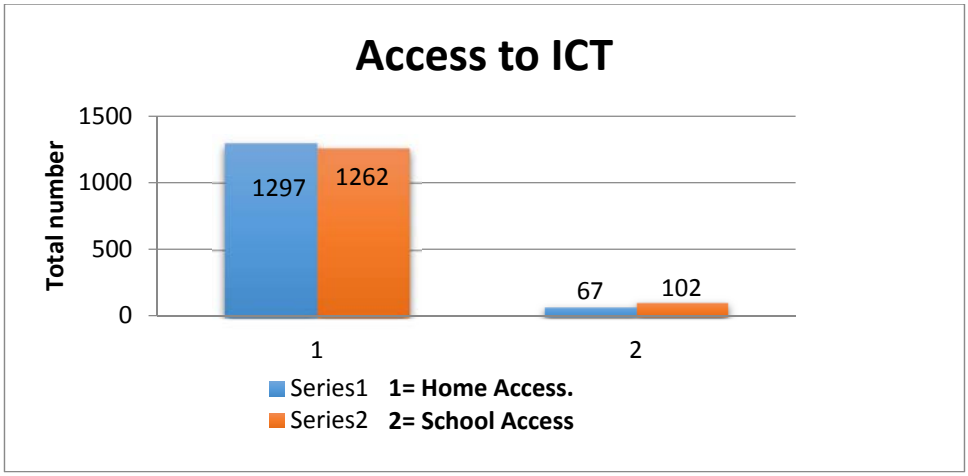

Figure 4. 10 Pupils access to ICT

A cross tabulation analysis was carried against computer access and the pupils' skills level to check the pattern of responses. Figure 4.11 below shows that the majority of pupils (52%) that have an intermediate skills level have access to computers both at home and at school respectively.

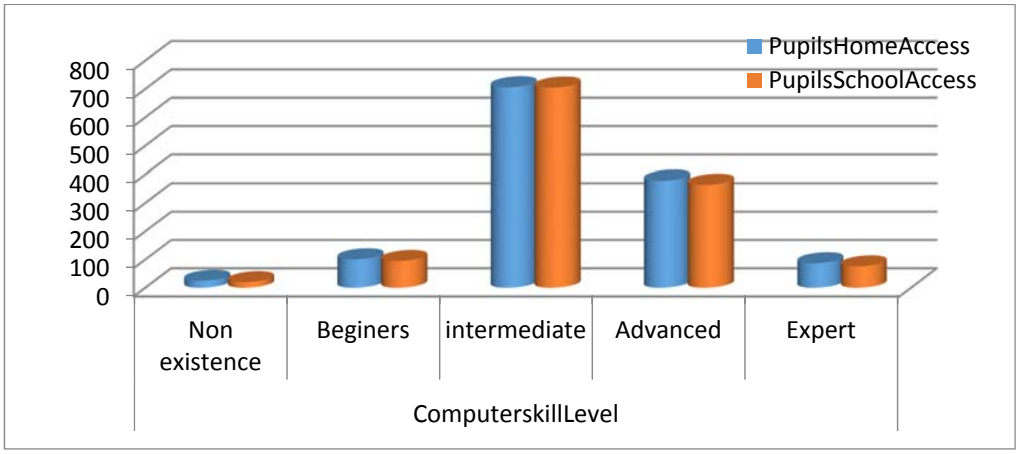

Figure 4. 11 Cross tab of pupils' computer access and skills level

A correlation analysis was carried out using Spearman's Rho, to find out if there is a relationship between access and skill level. The result as shown below revealed that there

is a negligible relationship between computer skills level and pupils access, (r = -.115, P < .000) thus suggesting a probability of a possible relationship between the two variables. On the contrary, a positive correlation was recorded between home access and school access (r =.241, p < 0.01) thus suggesting that as access at home increases, school access will also increase.

Table 4. 13: **Spearman's Correlation between Pupils' Computer access and skills level**

			Computer skills level	Pupils home access	Pupils School Access
1	Computer skills	Correlation coefficient Sig. (2 tailed N	1.00 1364	-115** .000 1364	-051 .061 1364
2	Pupil Home Access	Correlation Coefficient Sig. (2-tailed) N	-115** .000 1364	1.000 1364	.241** .000 1364
3	Pupils school Access	Correlation Coefficient Sig. (2-tailed)	-051 .061 1364	.241** .000 1364	1.000 - 1364

4.2.3 Pupils Computer Skills

On a five point scale where 5 is the highest value of expert level and 1 is the least value of non-existence level, respondents' opinions were sought on self-assessment of their skills level. These levels have already been defined in the previous chapter.

A good majority of the pupils (54%) perceived themselves to be at the intermediate skills level, followed closely with the advanced level (29%, n=1364), the expert level (7%, n=1364) and pupils at the non-existence level (3%, n=1364). The mean score of respondents on these skills levels were computed and the result is showed below

Table 4. 14: **Pupil Self-Perceptions of Computer skills level**

Computer Skills level		Frequency	indicators	Result
	Non Existent	34	Mean	3.28
	Beginner level	111	Median	3.00
	Intermediate Level	741	Mode	3.00
	Advanced level	389	Std Deviation	0.80
	Expert Level	89	Range	4.00
	Total	1364		

The table above reveals that the mean is slightly higher than the median and mode thus suggesting that the data is slightly skewed positively. This is further illustrated in fig.4.12 below.

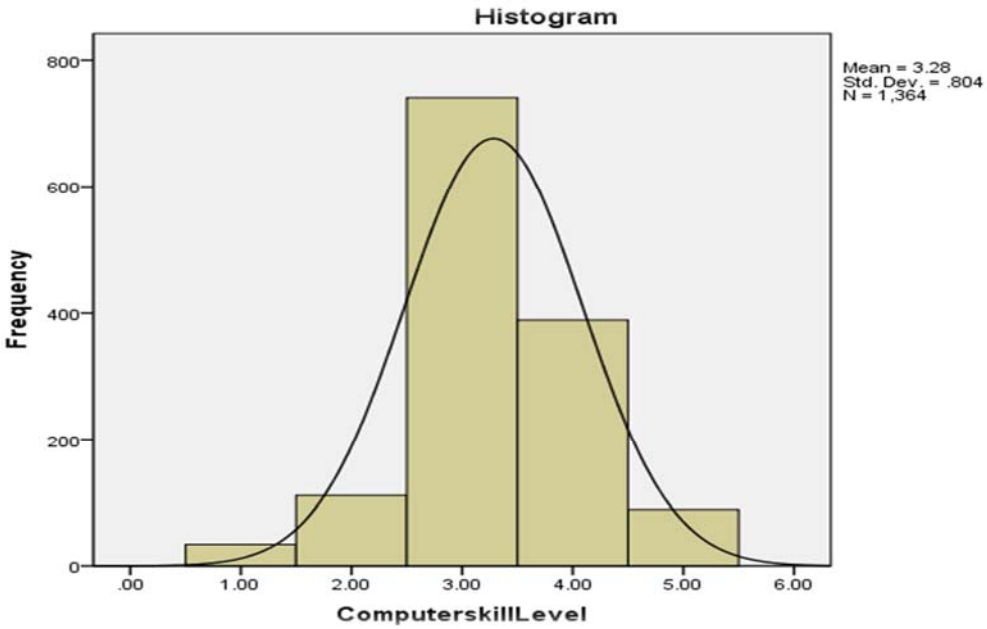

Figure 4. 12 Perceptions of Computer skills level

Descriptive analysis on the applications learnt in school was evaluated as first steps in order to see the pattern of responses and then establish whether there is a relationship between the applications learnt in school and the pupils computer skill level. Figure 4.13 shows the various applications that are used in school.

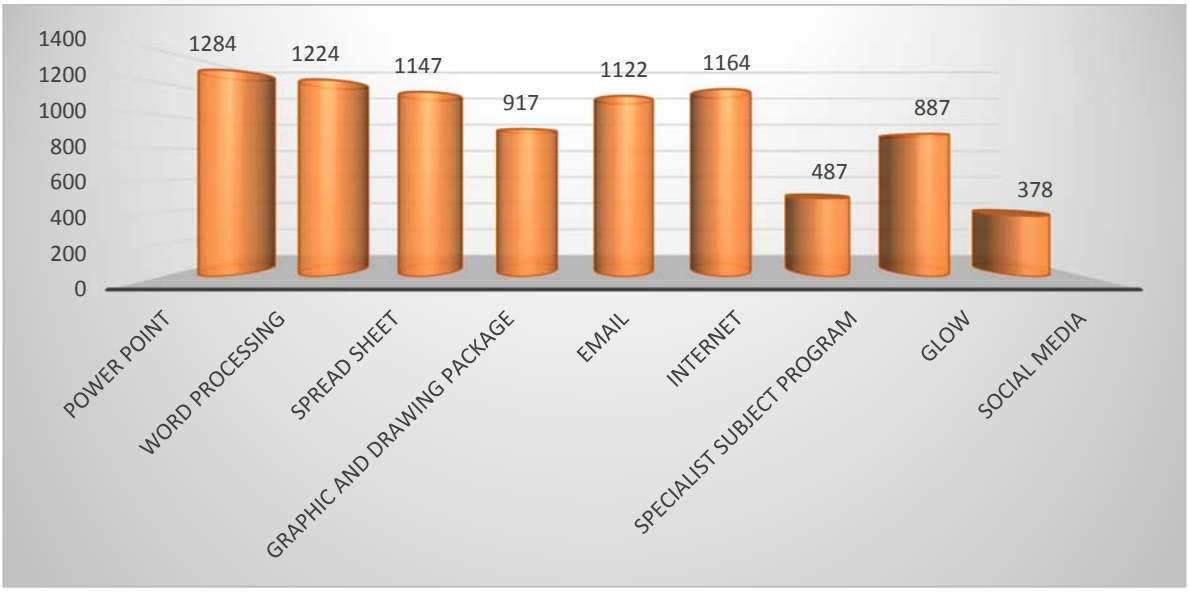

Figure 4. 13 Applications used in schools

From figure 4.13, in an ascending order, the most popular applications used in school is the power point (94%, n=1364), word processing (89%, n=1364), spreadsheet (84%, n=1364) and internet (86%, n=1364). Following closely is Email (82%, n=1364), Graphics and Drawing Package (68%, n=1364) and Glow (67%, n=1364). The least application used in school are the social media (30%, n=1364) and the subject specialist program (37%, n=1364).

4.2.4 Pupils Skills Gain

On a multiple choice question, pupils were asked to select more than one choice that best describes how they gained computing skills. The result displayed in the figure 4.14 below reveals that a vast majority of pupils acquired computing skills by being taught by a family member (47%, n-1364) prior to coming to school whereas about one third of that number learnt computing skills from school (21%, n= 1364). Others gained the skills through trial and error (9%, n=1364), playing games (5%, n=1364), and lastly through a friend (1%, n=1364).

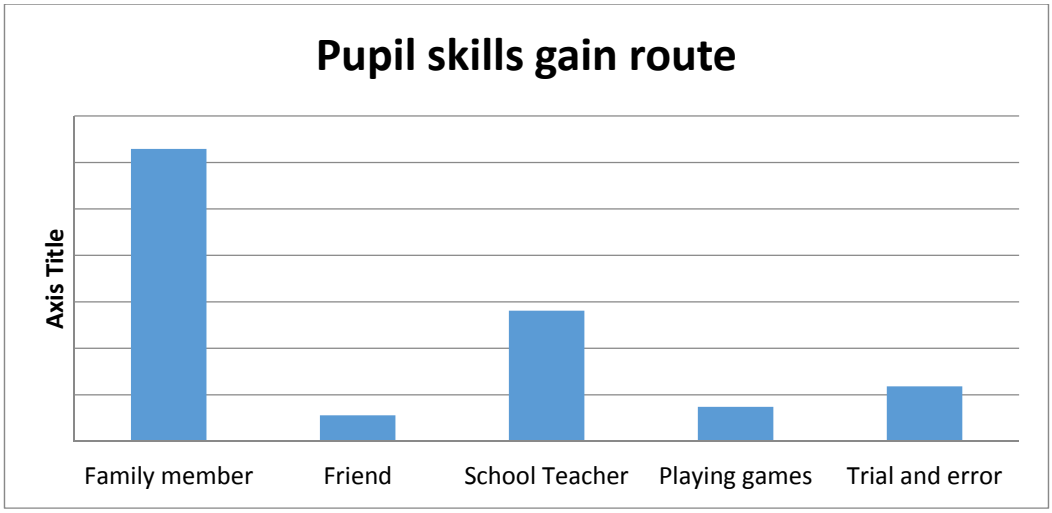

Figure 4. 14 Pupils' skills gain

The respondents were asked how often they use any of the ICTs in the school which included internet, email, word processing, spreadsheet, power point, and graphic and drawing packages. They were to select the frequency of use on a 1-5 Likert scale where 1 indicates regularly, 2 indicates quite often, 3 indicates sometimes, 4 indicates not very often and 5 indicates never. The details of what constitutes the scales have been explained in the previous chapter (chapter 3). The figure 4.15 below are quite revealing in several ways. Firstly, the response pattern suggests that the pupils use internet regularly, use emails and spreadsheet not very often, use word processing quite often, use power point sometimes and never use graphics and drawing packages. Secondly, the charts further reveals that the graphic and spreadsheets application recorded the highest number of respondents that has never used the application. However, whether or not these responses reflect the actual practise in the school will be worth exploring further. These responses are represented in figures 4.15.

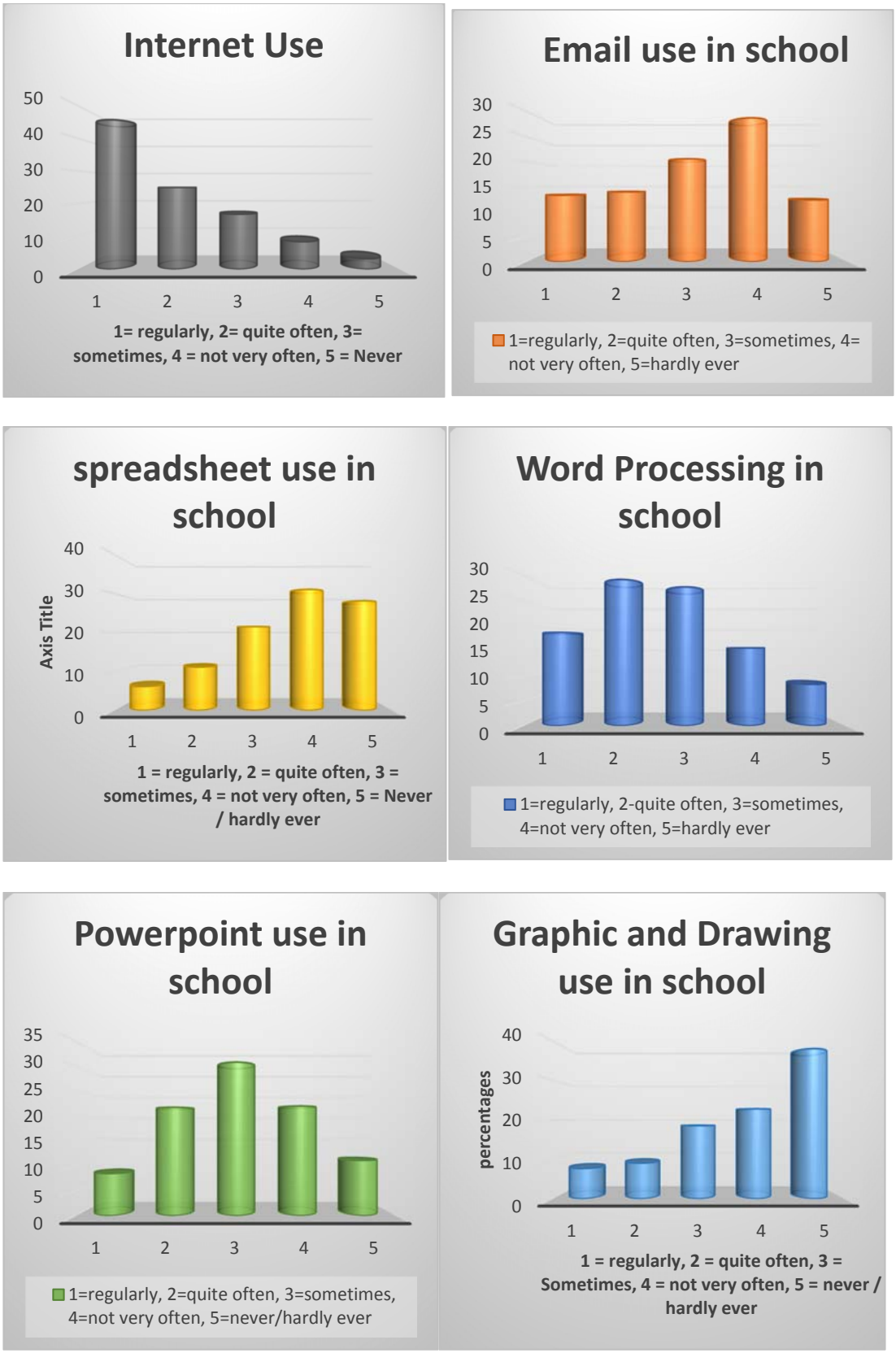

Figure 4. 15 Pupils' frequency of ICT use in school

The response to regular use of ICT in school was analysed further and displayed in figure 4.16. From figure 4. 16, internet has the most regular usage in school with over 45% of regular usage, while the Graphics and Drawing package had the least regular usage of below 10%. There could be a lot of reasons behind this result including the multi-functional nature of the internet and the explicit permeation of ICT in all subjects as required by the curriculum. Other packages like spreadsheet and graphic and drawing packages recorded low percentages of use. These will be discussed further in the next chapter.

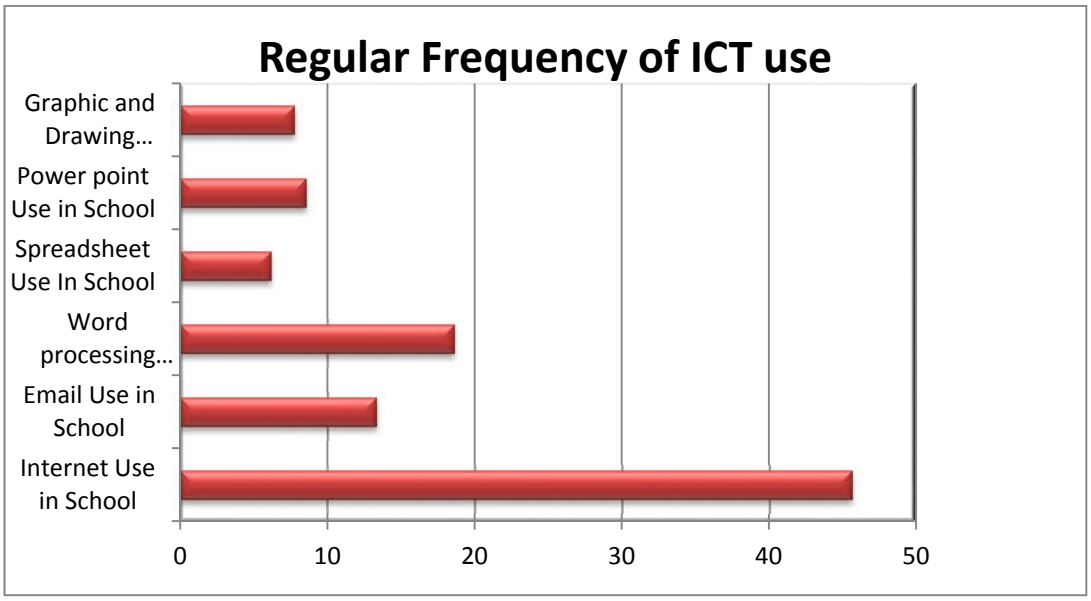

Figure 4. 16 Frequency of ICT use

4.2.5 Reasons for using ICT

Seven multiple choice questions were asked for respondents to select the answers that best highlight their reasons for using ICT. From the result displayed in figure 4.17, the highest response was on 'information search' while the least response was on email exchange with friends, thereby highlighting a difference of over 50% between the two responses. The

high response rate on the use of internet for search of information may suggest improved availability of ICT in schools or/ and also readiness of the pupils towards any associated generic skills development from the usage. The chat also reveals the reason with the second highest response to be 'chatting with friends in other school' while the least response was on 'email exchange with friends in another school'. These high response rates may allude to communication skills development, through different approaches.

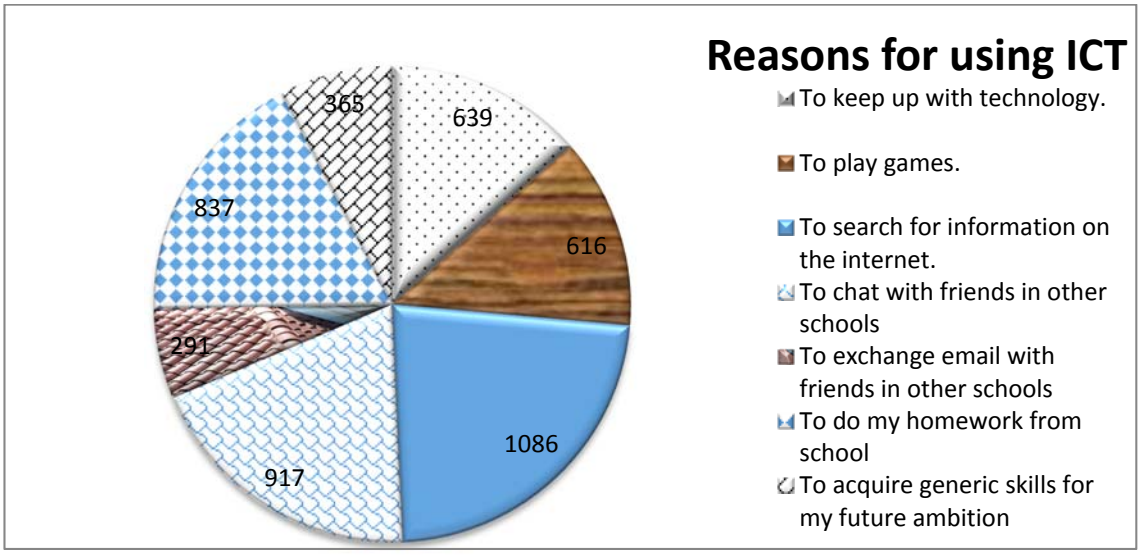

Figure 4. 17 Reasons for using ICT

4.2.6. Pupils' perceptions of ICT in school and skills development.

Respondents were asked to indicate on a five point scale, (where 1 is strongly agree and 5 is strongly disagree), their perceptions on the role of ICT in school. From the result as shown in the table 4.15, the majority of the respondents perceived ICT to have many potentials, but consider time to be a huge constraint in school towards achieving the full potentials of ICT. They also perceived ICT as aiding communication skills and interaction between other pupils and schools.

The results have been conflated for easy analysis and grouped into three columns to represent positive, negative and neutral responses respectively. The conflated result below suggest a strong pupil perception on the important role of the internet towards their future knowledge (82.2%, n=1364) teaching and learning (77%, n=1364) development of work skills (68.9%, n=1364) presentation skills (68.7%, n=1364) and development of skills beyond school use (64.5%, n=1364). On the other hand, a good number of pupils perceived ICT to be preparing them for further education (57.5%), for effective communication and interaction (47.4%, n=1364) and conversely noted that time was a constraining factor (47%, n=1364) as most pupils learn more at home than at school (48.9%). The overall mean score was 2.29 while the overall standard deviation was 0.91.

Table 4. 15: **Pupils' Perceptions of ICT in school and skills development**

	Variables	SA	A	C	N	D	SD	C	M	StD
1	ICT has an important part to play in teaching and learning generally.	24.9	52.1	**77**	20.1	2.4	0.5	**2.9**	2.02	0.77
2	ICT makes work easier	26.9	46.8	**73.7**	21.7	3.7	0.8	**4.5**	2.05	0.84
3	ICT makes learning enjoyable, more fun, and no boredom	26.4	42.0	**68.4**	25.4	5.4	0.8	**6.2**	2.12	0.89
4	I learn more with ICT at home than I do at school	22.1	26.8	**48.9**	33.9	14.4	2.9	**17.3**	2.49	1.07
5	The time spent on ICT at school is too short to develop any extra skills	14.3	30.4	**44.7**	31.6	20.8	2.9	**23.7**	**2.68**	1.05
6	ICT use at school gives me some extra skills that I can use in future	19.5	49.7	**69.2**	22.0	6.6	2.2	**8.8**	2.22	0.91
7	ICT use at school is adequately preparing me for further education	15.0	42.5	**57.5**	30.9	9.7	1.9	**18.2**	2.41	0.92
8	ICT helps me to communicate and interact effectively with other pupils in other schools	16.3	30.9	**47.2**	28.8	18.3	5.6	**23.9**	**2.66**	1.12
9	The internet helps me to gain more knowledge which is useful for my future	34.0	48.2	**82.2**	14.7	2.6	0.5	**3.1**	1.87	0.79
10	ICT use at school teaches neat presentation skills for pupils	19.3	49.4	**68.7**	23.6	5.9	1.8	**7.7**	2.21	0.88
11	The ICT use in school is developing adequate skills for pupils to use outside school	16.3	48.2	**64.5**	27.5	6.2	1.8	**8**	2.29	0.88
12	ICT use in school is developing the skills needed for work	20.7	48.2	**68.9**	23.6	5.9	1.6	**7.5**	2.20	0.89

Scale: SA- Strongly Agree, A- Agree, C- Conflated, N- Neutral, SD- Strongly Disagree, and D- Disagree, M- Mean, and StD –Standard Deviation.

4.3 Teachers Questionnaire Result

This section focuses on the result obtained from 67 teachers from 8 schools in one local council area of Scotland. This section aims to test the perceptions of secondary school teachers on the effectiveness of the ICT used in their teaching against the perceptions of pupils towards skills development. The responses will be reported under the following sub headings (a) teachers demographics, (b) teachers use of ICT (c) classroom use and frequency (d) computer access and (e) perceptions towards ICT in school

4.3.1 Descriptive Analysis of the respondents

The demographic information of teachers included the following- Age, gender, years of teaching, and highest academic qualification. Overall 67 teachers participated in this study. They were asked to complete a teacher's questionnaire (see appendix - I).

Table 4. 16: **Teachers descriptive analysis**

Variable	**Category**	**No of respondents**	**Percentage**
Age	20-29	9	13
	30-39	14	21
	40-49	17	25
	50-59	26	39
	60+	1	1
Gender	Male	24	36
	Female	43	64
Years of teaching	1 year	4	6

	2-4 years	7	10
	5-9 years	12	18
	Over 10 Years	44	66
Academic Qualification	HND	2	2.9
	University Degree	42	62.7
	Masters	16	23.9

There were more female respondents. Majority of the respondents had over 10 years' experience and were within the age group of 50-59. The table also reveals that a small minority of teachers hold a higher national diploma (HND) qualification with the majority having a university degree in addition to their teaching degree. Furthermore, a quarter of the respondent (24%) has a Masters degree in addition.

4.3.2 Response Rate

Table 4.16 displays a breakdown of the responses by category. The average rates of return of questionnaires were high (84%) as 67 questionnaires were returned completed from 80 that were distributed. The observable pattern of the responses shows a significant difference in the percentage of responses by gender, age and years of service.

4.3.3 Teachers Use of ICT

On a multiple response selection, teachers were asked to select the type of application they use for teaching. Interestingly, all options given were selected by all participating respondents thereby confirming advancement in ICT usage, although some applications attracted fewer responses due to their unpopular nature.

Table 4. 17: **Applications used for teaching**

	Positive response (n=64)	Negative response(n=64)	Mean	Standard Deviation
Power Point	62	2	1.03	0.18
Word Processing	55	9	1.14	0.35
Spread Sheet	35	29	1.50	0.50
Graphic and Drawing package	35	29	1.50	0.50
Email	50	14	1.22	0.42
Internet	58	6	1.10	0.29
Own Website	9	55	1.90	0.35
Specialist subject program	35	29	1.50	0.50
Glow	33	31	1.51	0.50
Social media	19	45	1.70	0.46

Overall about four applications received over half of the total responses. Starting with the most popular application -power point (97%), to internet access (91%), word processing (86%) and graphics and drawing packages (78%). Conversely, the least popular application among the teachers was individual/ own website (14%) and social media (30%). The result in the table 4.17 shows a mean in usage from 1.03 to 1.90. The

difference in PowerPoint responses (1.03) and own website responses (1.90) appears to be significantly different.

4.3.4. Classroom ICT Use and Frequency

The respondents were asked to rate the frequency of use of the following ICT in their teaching in the classroom on a 1-5 scale where 1 indicated "regularly" and 5 indicated "never or hardly ever". The analysis commenced with a descriptive statistic of the frequency of the most regularly used ICTs and the hardly ever used ICT as displayed in Table 4.18.

Table 4. 18: **Teachers' classroom use of ICT**

Variable	**Regularly**	**Quite often**	**Sometimes**	**Not very Often**	**Never / Hardly ever**
Internet use for Academic information retrieval	46	12	3	2	1
ICT for administration and records purposes	56	6	2	0	0
Pupils ICT use in lesson	28	15	12	8	1
Teacher Use of ICT in teaching	48	9	6	1	0
Email for school and professional purposes	55	7	2	0	0

From table 4.18, email has the most responses of regular use among teachers (86%, n=64) whereas pupils use of ICT during lessons (43%) had the least regular response. This result implies that the teachers' use of ICT in school tends to enhance the teachers work rather than impacting generic skills of the students.

Further analysis was carried out to check the relationship of the variables using the spearman correlation. Overall, table 4.19 shows that there is a positive interaction between the variables, although their level of strength differs significantly. The result in Table 4.19 shows a strong positive correlation between teachers' use of ICT in teaching and pupils' ICT use during the lesson ($r=0.518$) which is significant ($p=0.01$. However, this result further extends the findings in the frequency table which shows a lower percentage of pupils' use of ICT during teaching.

Table 4. 19: **Correlation matrix of teachers ICT use in school**

SN	Variable	Variable				
		1	2	3	4	5
1	Internet for Academic Information Retrieval	1.000	.186 .142 64	.174 .168 64	**.395**** .001 64	.218 .084 64
2	ICT for Administration and Records purposes		1.000	.160 .205 64	**.482**** .000 64	**.661**** .000 64
3	Pupils ICT Use in Lesson			1.000	**.518**** .000 64	.211 .094 64
4	Teacher Use of ICT in Teaching				1.000	**.518**** .000 64
5	Email for School and Professional development					1.000

**. Correlation is significant at the 0.01 level (2-tailed).

This result indicates a possible communication skills development. There is also a strong correlation between Teachers use of ICT in teaching and ICT for Administration and

records purposes (r=0.482) implying that the more teachers use ICT as part of their administration work, the more likely they are going to use it in the classroom for teaching. A further correlation analysis confirms that there is a strong positive correlation significant at 0.01 found between teachers email use and teachers' ICT use for administration and record purposes (r=0.661).

Table 4. 20: **Descriptive statistics of respondents' access, skills level and skills gain routes**

Variable	**Category**	**No (n=67)**	**Percentage (%)**
Access	Home	67	100
	School	67	100
Skills Level	Non existence	0	0
	Beginner Level	2	3
	Intermediate Level	29	43
	Advance Level	23	34
	Expert Level	13	19
Skills Gain	School organised Teacher training course	38	59
	Computer training course	27	42
	Part of degree course	24	38
	Assisted by colleague	20	31

	Assisted by family member	46	72
	By Trial and Error	18	28

4.3.5 Computer Access and Skills level.

Table 4.20 presents the descriptive analysis of the respondents' access (home and school) to ICT, the perceived skills level and how the respondent gained his / her computer skills. From this table, the majority of the respondents were on the intermediate skills level and had gained skills through assistance from their family members and friends. This is consistent with the response from the pupil's questionnaire.

A correlation analysis carried out to check the relationship between skills level and skills gain routes is displayed below in table 4.21. The data reveals that there is a strong positive correlation between skills level and skills gain through family and friends assistance ($r=0.436$) where correlation is significant ($p=0.01$) at level (2 tailed). A significant relationship at 0.05 level was also established in a correlation analysis between skills level and skills gain route through colleague assistance ($r=0.252$) indicating a relationship between the two. Although a weak but positive relationship, however it highlights the effectiveness of a personalised style of informal skills gain route.

Table 4. 21: **Correlation analysis of skills level and skills gain routes**

Computer Skills Level			In School Training	Assisted By Colleague	Assisted By Family and Friend
Spearman's rho	Computer Skills Level	1.000	.209	.252*	.436**
			.098	.044	.000
			64	64	64
	In School Training		1.000	.146	.119
				.250	.347
				64	64
	Assisted By Colleague			1.000	.347**
					.005
					64
	Assisted By Family and Friend				1.000

*. Correlation is significant at the 0.05 level (2-tailed). **. Correlation is significant at the 0.01 level (2-tailed).

On a multiple choice scale, respondents were asked to select the statement that matches their reasons for using ICT in their teaching as displayed in table 4.22. Over all, the mean scores (M) in the table suggests that most teachers are positive about the use of ICT especially as it improves teaching and development (M= 1.16, SD= .366). Conversely,

only a quarter of the respondents use ICT due to policy document recommendation or as a sign of modernisation (M=1.79, SD= .405).

Table 4. 22: **Reasons for ICT use in class**

SN	Variable	Frequency	Percentage (%)	Mean	Std. Deviation
1	Technology Advancement	42	66	1.34	.48
2	Compulsory By CfE	10	16	1.84	.37
3	To Maintain Interest	39	61	1.40	.49
4	Readily Available	40	63	1.38	.49
5	Teaching Improvement and Development	54	84	1.16	.37
6	Symbol Of Modernization	13	20	1.80	.41
7	Impacts Generic Skills	28	44	1.56	.50
8	Information Conveyance	55	86	1.14	.35
9	Professional Teaching Method	32	50	1.50	.50

A cross tabulation analysis was further taken to check the pattern of responses on the variable – 'impacts generic skills' against age and the result showed that the majority of teachers within the age range of 50 – 59 use ICT more in teaching based on their perceptions that it improves generic skills. This pattern was further analysed through cross tab by checking the respondents' years of teaching against no 7 reason for using ICT in

teaching and is shown in the table 4.23. Table 4.24 also confirms that the majority of the respondents have over 10 years of experience.

Table 4. 23. Cross tab of Age Vs Generic skills.

Age	Frequency for Impacts on Generic Skills
20-29	7
30-39	5
40-49	4
50-59	12
Over 60	0
Total	28

Table 4. 24. Cross tab of teaching years Vs generic skills importance

Years of Teaching	Frequency for impacts generic skills development
1	3
2-4	6
5-9	4
Over 10 yrs.	15
Total	28

4.3.6 Teachers' perception of ICT in schools.

Respondents were asked to indicate on a five point scale ranging from strongly agree (1) to strongly disagree (5) their perceptions of the use of ICT in school. Overall there are positive perceptions of over 50% among respondents on all the statements. As displayed in figure 4.18, the pattern of responses suggest that the majority of the respondents

strongly perceived the importance of ICT in teaching and learning (95%) as it helps in neat presentation (99%) and equips pupils with transferable skills for further education (89%).

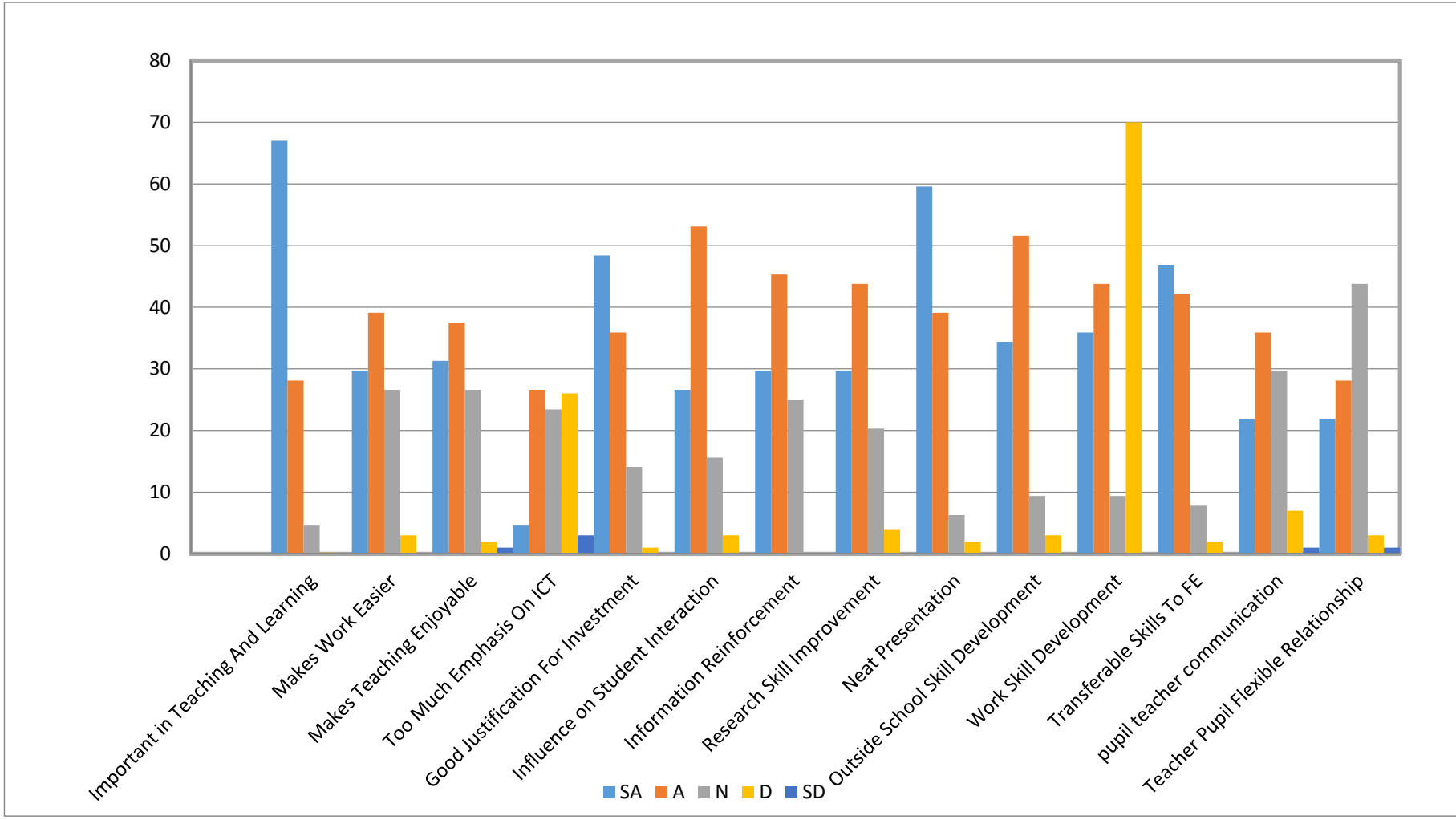

Figure 4. 18 Teachers' response pattern to perceptions of ICT in schools

On the other hand**,** the respondents tend to disagree that there is too much emphasis on ICTs in school. Table 4.25, displays the mean and standard deviation across the responses.

Table 4. 25: **Descriptive statistics on respondents' perceptions on ICT in school**

Variable	**SA**	**A**	**N**	**D**	**SD**	**Mean**	**StDev**	**Conflated**		
								+	**?**	**-**
Important in Teaching And Learning	67	28.1	4.7	0.2	0	1.38	.58	**95.1**	**4.7**	**0.2**
Makes Work Easier	29.7	39.1	26.6	3	0	2.06	.87	**68.8**	**26.6**	**4.6**
Makes Teaching Enjoyable	31.3	37.5	26.6	2	1	2.06	.92	**68.8**	**26.6**	**4.6**
Too Much Emphasis On ICT	4.7	26.6	23.4	26	3	3.14	1.02	**31.3**	**23.4**	**44.3**
Good Justification For Investment	48.4	35.9	14.1	1	0	1.69	.77	**84.3**	**14.1**	**15.7**
Influence on Student Interaction	26.6	53.1	15.6	3	0	1.98	.79	**79.7**	**15.6**	**4.7**
Information Reinforcement	29.7	45.3	25.0	0	0	1.95	.74	**73**	**25.0**	**0**
Research Skills Improvement	29.7	43.8	20.3	4	0	2.03	.87	**73.5**	**20.3**	**6.3**
Neat Presentation	59.6	39.1	6.3	2	0	1.60	.75	**98.7**	**6.3**	**3.1**

Outside School Skills Development	34.4	51.6	9.4	3	0	1.84	.78	**86**	**9.4**	**4.7**
Work Skills Development	35.9	43.8	9.4	70	0	1.95	.95	**79.7**	**9.4**	**10.9**
Transferable Skills To FE	46.9	42.2	7.8	2	0	1.70	.76	**89.1**	**7.8**	**3.1**
pupil teacher communication	21.9	35.9	29.7	7	1	2.34	1.01	**57.8**	**29.7**	**21.5**
Teacher Pupil Flexible Relationship	21.9	28.1	43.8	3	1	2.40	.93	**50**	**43.8**	**6.3**

Scale: SA= strongly agree, A= Agree, N= Neutral, D=Disagree, SD= strongly disagree

From table 4.25, the overall mean is 2.01 and the overall standard deviation is 0.83 indicating a high positive perception of ICT in teaching. It can also be observed that there is a strong positive perception of the usefulness of ICT in schools and its effect on skills acquisition for the pupils post school transitions. It is interesting to note that the statements on the effectiveness of ICT in school on skills development for outside school use received 86%, work skills development 80% and transferable skills to FE 89% by respondents. These perceptions were analysed further to check the pattern of responses by the respondents' gender as displayed in figure 4.19 below.

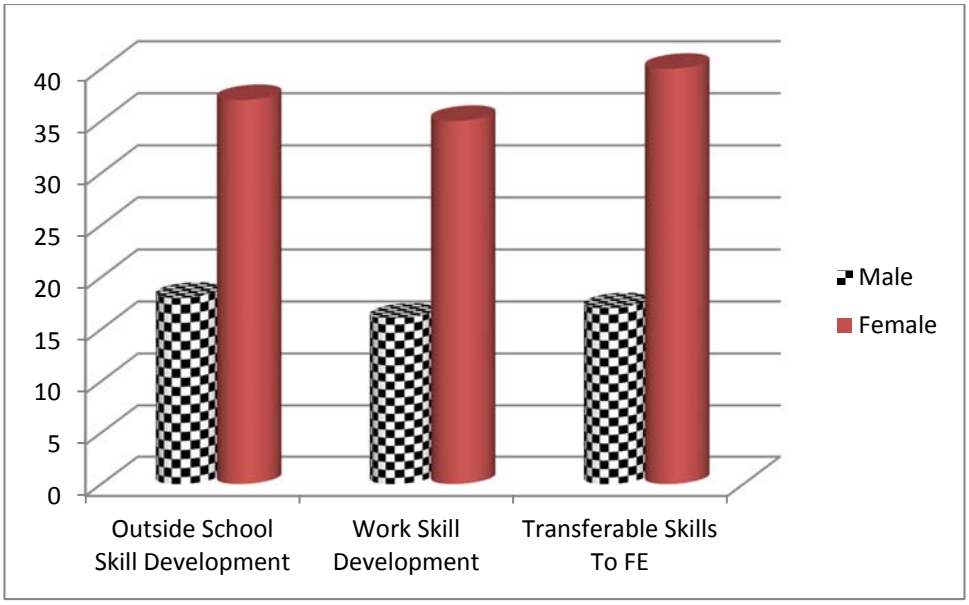

Figure 4. 19 Comparison of responses by gender on three key variables.

From figure 4.19, there is a predominant response by females' respondents in all three statements. The data was further analysed by comparing the pattern in the respondents' years of experience against the variable.

Figure 4.20 below indicates that there are more respondents with over 10 years of teaching experience that perceived positively the role of ICT on skills development and these respondents are mostly female. There is an observable difference in the perception of these respondents on the three key variables -'outside skills development', 'transferable skills to FE' and 'work skills development' from ICT use in school.

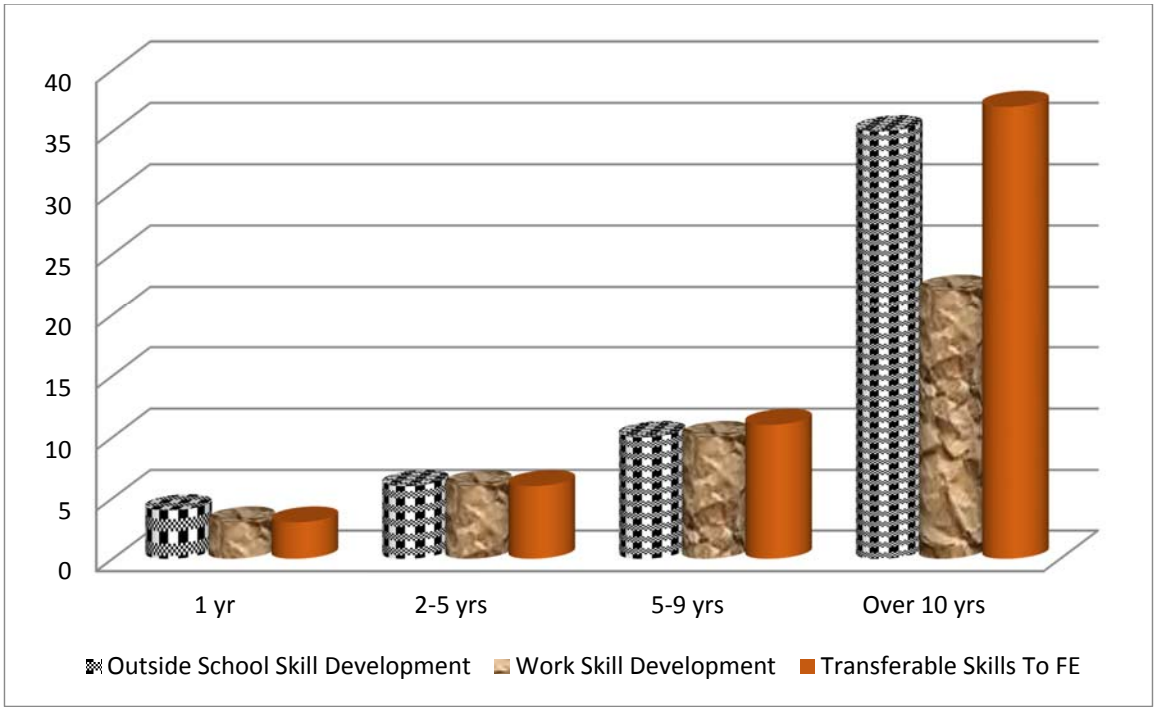

Figure 4. 20 Comparison of responses by years of experience on three key variables.

The respondents with 2-5 years of teaching experience and 5-9 years teaching experience seem to have fairly normally distributed responses on the role of ICT on all three variables - skills development for outside school, work skills and transferable skills to FE, respectively thus indicating uniform agreement. However, the responses from respondents with over 10 years of teaching experience varied significantly, especially on work skills development. This highlights disparity and suggests further exploration of the opinion of the respondents.

4.4 Employers Questionnaire Result

The aim of this section is to analyse the opinion of the employers that had either recruited school leavers in the last 12 months or currently work with one in their organisation. These employers are mainly those in an establishment level rather than at enterprise level. Employers with one employee or a sole trader were excluded from participation. This section seeks to find out the general perceptions of these employers on the generic skills that the school leaver brings in to the work setting and their readiness to work. This section will also display the employers' perceptions of the role that ICTs used in schools had played on employability skills acquisition. Furthermore, it will help to ascertain whether or not there is fit for purpose on the explicit role of ICTs in school as recommended by the Curriculum for Excellence towards generic skills acquisition and the best place for the learning of these 'required' skills for employability.

The research question guiding this analysis is hereby restated as thus 'Do employers see a 'fit' between the acquired generic skills from school and the required employability skills for work'. A self-assessment of the employers' ICT skills level was considered necessary as first step in order to provide a background of the employers and to determine their suitability for assessing the pupils' skill level. This self-assessment of the employers own skills and the nature of their job allowed them to have a predetermined skills level expected from the pupils.

This sectional result will present percentages and frequencies of the employer survey respondents. The report will be presented under the following sub sections -demographics

of the employers, access and ICT usage, and employers' perceptions of ICT in schools. These sub sections are in line with the format of the distributed questionnaire.

4.4.1 Demographic analysis of the respondents

The demographic information summarized in table 4.26 covers the respondents' age, gender, years of experience, and academic qualification. This gives an informed background of the respondents' characteristics. Overall 17 respondents participated in the survey from a possible 20 questionnaire that were distributed.

Table 4. 26: **Employers descriptive analysis**

Variable	Category	No of respondents	percentage
Age	16-25	1	6
	26-35	3	18
	36-45	6	35
	46-55	5	29
	56-65	2	11
Gender	Male	10	59
	Female	7	41
Years of Experience	1 year	3	18
	2-4 years	2	12
	5-9 years	3	18
	More than 10 years	9	53
Qualification	First degree only	4	24

	First degree and technical certificate	13	76
	Technical qualification only	2	12
	Post graduate / Masters	3	18

Table 4.20 shows the demographics from the 17 respondents. The majority of the respondents are in the age range of 36-55years and had over 10 years of work experience. Interestingly, this majority of respondents have additional technical or professional certificates to their degree and in some cases a higher degree to be fit to perform their task. There were more male respondents (10, n=17) than female (7, n=17) which may partially be attributed to the type of participating organization and further suggests more male employees in management positions. The participating organisations included, engineering, retail, sales and marketing, administration and management, tourism, IT solution and banks.

4.4.2 Response Rate

There was a response rate of 85% as 17 questionnaires were returned completed from 20 questionnaires that were distributed. This rate of return is considered very high, in line with most studies with over 40% return rate. It is also strategically an important response rate as it represents opinions of various work groups in the participating establishment while at the same time reflecting on respondents' characteristics in the participating

establishment. As displayed in table 1, the observable pattern of response is distinct from age, gender and years of experience.

4.4.4 Computer Skills

Figure 4.21 below displays the result of the self-perceived computer skills level of the respondents and how these skills levels were gained. These five skills levels have already been explained and labelled in the methodology chapter (chapter 3) as non- existence skills level, beginner skills level, intermediate skills level, advanced skills level and expert skills level.

On a single choice question, respondents were asked about their computer skills level and the result represented in figure 4.21 indicates that the respondents were mostly at the intermediate computer skills level. At this level, there is an assumption that the respondents know the basics and working knowledge of computers, are conversant with windows PC, and Microsoft packages - excel, word, and power point, email, and social networking. There was no response for the non-existence level and the beginners' levels respectively. Figure 4.21 highlights the fact that over one third of the respondents have intermediate and advanced skills level while almost a quarter of the respondents possessed an expert skills level. This result indicates that a majority of the respondents (59%) have a working knowledge of the computer that is beyond basic knowledge. This result also suggests a possibility for further development on higher skills level.

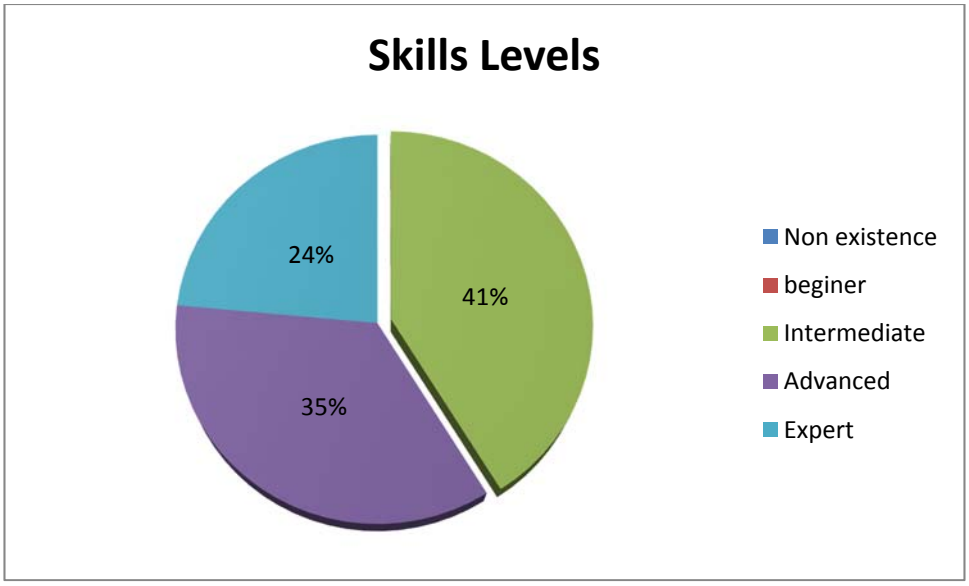

Figure 4. 21 Computer Skills Level

Figure 4.22 highlights some of the different routes that impacts on skills level acquisition. The results highlight that all respondents gained skills through IT courses, which is an 'add on' to their foundational degrees. This result questions the skills of the respondents at the time of engagement into their current job and any related skills mismatch issues. While a reasonable number of respondents had additional ICT skills gain by being taught at home (77%), others taught themselves through trial and error method (71%). This result suggests multiple routes to ICT skills development and a possibility of harmonizing the routes.

From this result, it can also be seen that the least responses came from respondents who learnt ICT as part of their degree (35%) and those who learnt at school (35%) which may suggests shallow depth of course content and possibly lead to a mismatch of the 21st century skills expectation. This decline in result from these routes could be suggesting a

need for content review of what is learnt in school and whether or not work skills should be learnt either in school, at the higher education or at the work place.

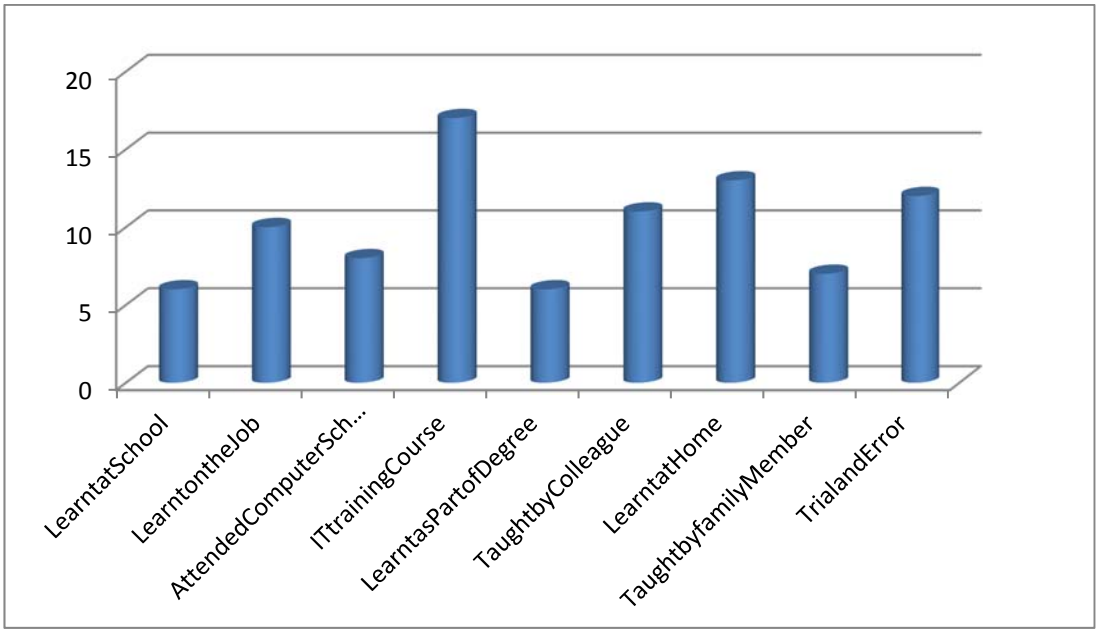

Figure 4. 22 Employers computer skill gain routes

Depending on the focus of the organisation and the proposed job schedule of the new or prospective employee at the point of recruitment, there will be variations in the reasons for using ICT, with the expectation of improved skills levels and skills routes. Table 4.27 below displays some of the reasons why employees use ICT in their organisation.

The data in table 4.27 indicate that ICT is regularly used among the respondents as the job task of the majority of the respondents (76%) is ICT based. The reasons for this high use vary while most reasons for respondents to work with ICT in the organisation seems to lean more on the accuracy and efficiency of ICT (100%) and to make the job relatively easier (100%). In some cases, it is more about the improvement of life skills. Although this reason recorded the least response rate (53%), it represented the responses of over

half of the overall participants. This means that the role of ICT for these respondents is based on their job task outcome. This result confirms the different identities of ICT in the work environment- either as a set of skills or as a tool.

Table 4. 27: **Employers' reasons for using ICT in an organisation**

variables	**Yes**	**No**
Accurate processing	17	0
makes job easier	17	0
inevitable for my job task	13	4
improves skills for life	9	8
improves acquired generic skills	14	3
conveys information quickly	17	0

4.4.5 Employers perceptions of ICT in education

On a five point scale ranging from 1 (strongly agree) to 5 (strongly disagree), respondents were asked to rate their perceptions of the effectiveness of the ICTs in school towards developing generic skills for employability among young school leavers. The result which is presented in Table 4.28 have been conflated such that 'strongly agree' and 'agree' has been merged to be positive response and ' strongly disagree' and 'disagree' merged to be negative response while 'neutral' still maintains its original position. The reason for conflating the result is to make the presentation and analysis easier to interpret and to enable a clear distinction from positive response to negative response.

Over all, the results show that all respondents were positive on the fact that ICT has a vital role to play in the society, although the role is variable. The support for this statement could be attributed to the associated role of ICT in the respondents' establishment, the fact that it improves generic skills acquisition (94%), which are transferable from one setting to another (65%), and most importantly, very useful at work (65%). While the majority of the respondents (100%) agree that the investment in school ICT is worthwhile as it could lead to generic skills acquisition, 18% disagree that there are no positive relationships between ICT use in school and ICT use at work, and 41% are of the opinion that work skills from school leavers are poor.

Conversely, some respondents are quite positive that they will engage a young school leaver because of the possessed skills (65%), as most of the respondents (77%) believe that ICT skills learnt at a young school age are more sustainable than at later age, although this assertion challenges the 'digital native and digital immigrant' (Prensky, 2001) debate. These results suggest that work skills can be learnt either at school or in the work place but the more sustainable route should suffice. Interestingly, 35% of the respondents are undecided on the impact of school ICT on work skills acquisition. This response rate may have been guided by the experience of these employers working with school leavers. These undecided numbers representing over one third of the total number of participants are significant as their opinion might swing either positively or negatively with time. The undecided responses might be due to lack of close working or long term working with the school leaver to be able to form an opinion and their opinion can go either way (positive or negative) in the long run. These are displayed in the table 4.28.

Table 4. 28: **Employer's perceptions on the development of generic skills from school ICT**

SN	Statements	Agree	Neutral	Disagree
1	There is a good justification for the investment in ICT in schools in terms of skills acquisition	17	0	0
2	The ICT I used during my school days prepared me for ICT use at work	7	4	6
3	The acquired ICT skills at school are very useful at work.	11	3	3
4	Acquired ICT skills from school are more generic and transferable.	11	4	2
5	ICT skills improves Generic skills for the knowledge society	16	1	0
6	There is a positive relationship between the ICT use at school and required work skills	9	5	3
7	Work skills are better off subject dependent at school and core to the Curriculum	11	6	0
8	ICT Skills learnt at a young school age are more sustainable than at later age.	13	3	1
9	ICT use improves employee relationship.	8	7	2
10	Pupils coming from school to work come readily prepared with the right skills	7	3	7
11	I will employ a school leaver because of his skills	11	6	0

Figure 4.23 displays a further analysis of the responses contained in table 4.28. The pattern of responses from the conflated result above shows that there are over 50% (n=17) positive response rates on nine out of 11 items (variables). The result also displays a positive perception by respondents on the variable 'good justification for investment in ICT in schools' (100%, n=17) and a high response rate to 'skills development for knowledge society' (94%, n=16). There is an observable negative response rate on the item (variable) 'pupils come ready with the right work skills' (41%, n=17) and 'school days ICT prepared me for work' (35%, n=17), implying a possible bias in the engagement of school leavers

in the employment sector on one hand, and the uniqueness of the employment industry on the other hand.

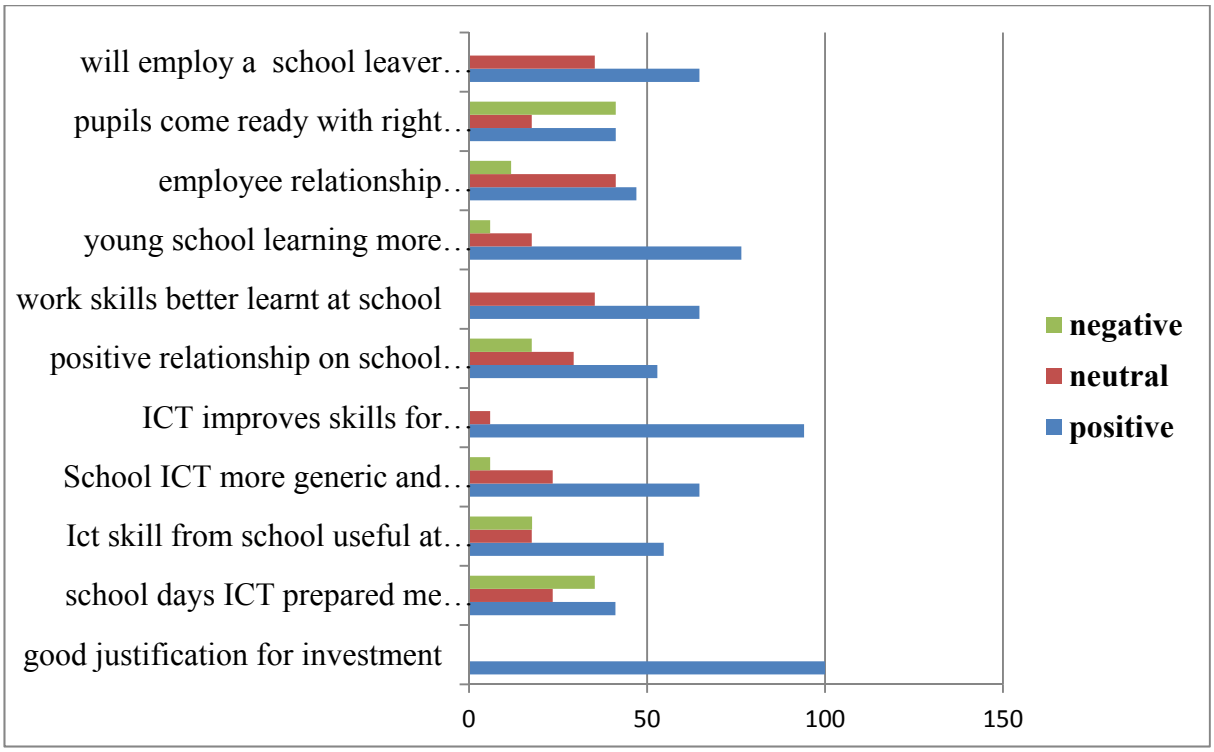

Figure 4. 23 Employers' response pattern to perception of ICT in education

A cross tabulation is carried out on the variable – 'skills development for knowledge society' against respondents years of service. The result, as shown in figure. 4.24 below shows that there is a higher positive perception from employers with longer years of service towards the relationship between ICT in schools and skills development. This implies that as skills evolves in a fast growing industry like ICT there is an expectation for the employer to evolve accordingly. In that situation, time, becomes a determining factor for a reinforced skills development. This assertion will be explored further in the discussion chapter (Chapter 5).

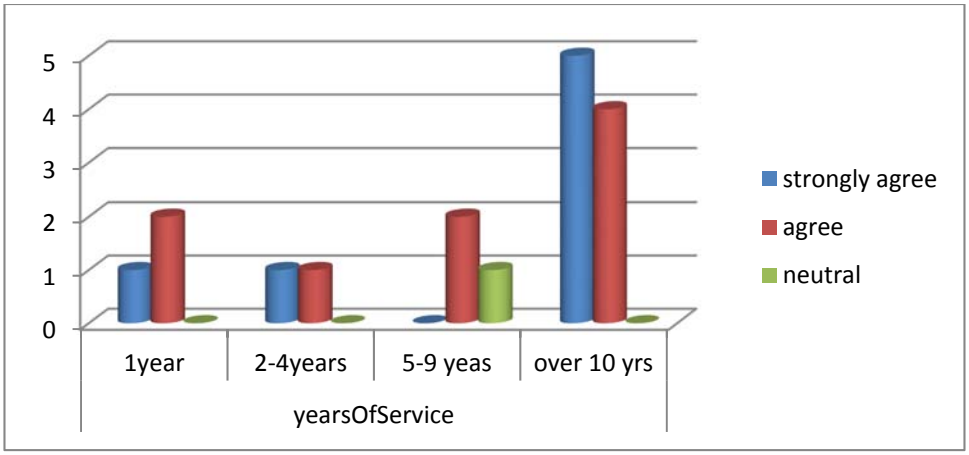

Figure 4. 24 Comparison of employers' response pattern by years of service to the variable – ICT Improves Skills for Knowledge Society.

Similarly, the two variables with the highest negative response -'pupils come ready with the right work skills' and 'school days ICT prepared me for work' was cross tabulated against years of experience, the result showed a high response from respondents with lengthy years of service. With this in mind, the probability of an employer with lengthy years of service to hire a school leaver at a later stage of his service years is higher than otherwise.

Table 4.29 presents correlation coefficient analysis of employers' perceptions of the usefulness of ICT in school on skills development. The data reveal that a strong positive correlation significant at the p= 0.01 level exists between school ICT and transferable generic skills (r =0.552*) and on the other hand, between school ICT and knowledge society skills improvement (r=.612**). This result implies that as ICT is effectively used in school, the more likely for employability skills to be developed. So as one variable improves; the other is more likely to improve although the effectiveness of its transferability from the school setting to other settings becomes another issue.

Table 4. 29: **Correlation Matrix on employers' perception of variables**

			1	2	3
1	Spearman's rho	ICT skills from School Useful At Work	1	0.552* 0.22	0.612** .009
2		School ICT more generic and Transferable		1	
3		Improves Skills for Knowledge Society			1

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

4.4.3 Access and ICT usage

Respondents were asked if they had access to ICT at home and at work. The reason for this question was to establish a level of skills acquisition associated with access and use. With the result showing a 100% access level for respondents at home and at work respectively. These results eliminate the issue of restriction to use which can arise when access is limited. With an established access the researcher was keen to know the kind of activity and application that respondents use.

Table 4.30 highlights a positive spread on availability of ICT and the expected impact on access. It also indicates a positive perception of employers on ICT access and usage as it is expected that over time usage can build up skills levels, although this might not determine the effectiveness of use.

Question: What type of application do you use for your role in your organization?

Table 4. 30: **Types and use of Application.**

Variables	Positive response (n=17)	Negative response(n=17)
Power Point	12	5
Word Processing	11	6
Spread Sheet	15	2
Graphic and Drawing package	6	11
Email	17	0
Internet	17	0
Own Website	10	7
Specialist program	10	7
Database / Access	14	3
Social media	7	10

From table 4.30, all applications received over 50% positive responses implying a high usage of ICT except for social networks which received the least response with 41%. This least score on social media points to the nature and focus of the organisation. The internet and Email were the most recorded popularly used applications as they recorded 100% responses. This positive response rate is important because it highlights its capacity of supporting communication which can be a key generic skills in the work setting. The next most frequently used applications, which is the spreadsheet and the data base with over 80% responses supports this position of high response. As will be expected, the usage of

these applications will improve an existing skill of an employee where applicable or impact a computer skill where none is available.

4.4.6 Comparison of the responses of the three cohorts of participants on key variables

This section aims to examine the differences (if any) between the perceptions of these three groups of participants. The distribution of the overall mean rating given by these groups of respondents across the questionnaire variables are perceived to be high and consistent as summarized in the table 4.31. There is a close relationship between the results for each cohort which can be deduced from the tight standard deviation thereby highlighting very little variance since the result of each group appears to be supporting one another.

Table 4. 31: **Teachers, Pupils and Employers Skills level perceptions.**

Group	Mean	Standard Deviation
Teachers	3.73	0.82
Pupil	3.28	0.80
Employers	3.82	0.81

But the three key variables in the questionnaire– 'ICT in school develops transitional skills for outside school use', 'ICT use in school is developing adequate skills needed for work' and 'ICT aids effective interaction', has a variable mean rating as displayed in table 4.32. These responses suggest a positive correlation of employers and pupils perceptions of skills requirement (Green, 2003). The perceptions of the pupils and employers are similar in mean scores but the perceptions of the teachers are contrasting from that of the pupil

and employers. There could be a lot of reasons for these differing perceptions ranging from frequency of ICT usage in work place, role in the organisation, to the actual reasons behind the use of ICT, depending upon the cohort involved.

Table 4. 32: Key variables from the questionnaire for the three groups

	Mean			Standard Deviation		
	Pupils	Teacher	Employers	Pupil	Teacher	Employers
ICT use in School Develops transitional Skills for Outside School use	2.29	1.84	2.29	0.88	0.78	1.1
ICT use in School Develops Work Skills	2.2	1.95	2.18	0.89	0.95	1.42
ICT Aids Effective Interactions	2.66	1.98	2.4	1.12	0.77	1

The survey highlights that most teachers (63%, n=67), especially the younger teachers (23%, n=67) use ICT to enhance their teaching or for administration work, while the more advanced teachers use it for generic skills impact (40%). This contrasts with the employers whose task could not be done without ICT due to the accuracy and efficiency that it exhibits. Comparing the groups' responses individually on the variables in table 4.32, it is observed that respondents on the pupil survey and the employer survey had similar views on the effect of ICT in school on the development of Transitional skills for use beyond school with a mean score of 2.29 respectively as displayed in table 4.32.

This uniformity in response could suggests a connection between school and the outside world (work, HE or living) or it could be purely coincidental. The response pattern is also consistent with the next variable on work skills development from school ICT use. It is observed also that the mean score of the respondents to both pupil and employer survey is not significantly different from each other. This could indicate a likely positive outcome

on embedding employability in the curriculum but the contrasting responses of the teachers could suggest differently and is worth exploring further as this partly informed the interview with teachers. The pattern is also maintained on the next variable - ‘effective interaction and communication development through school ICT use’.

4.5. Overall Survey Results Summary

Teacher survey:

Descriptive statistics were calculated for the fourteen items on the teachers' questionnaire which had an 84% response rate with most respondents having over 10 years of teaching experience and dominated by female participants. The analysis highlighted 4 application packages (PowerPoint, Word processing, Graphics and drawing packages and the internet) as the most popular ICT used in school by respondents. However, the usage was mainly to enhance the respondents' administrative duties rather than to impart or develop skills among the pupils. This situation, which was partly as a result of pupils low usage rate of ICT during teaching (43%) displayed a strong positive correlation when correlated with teachers use of ICT in school ($r= 518$, $p<0.01$). Further correlation analysis showed a positive relationship between teachers skills level and skills gain route through family and friend ($r=.436$, $P <0.00$) and colleague assistance ($r=.252$, $P<0.00$).

Analysis of teachers' reasons for using ICT in school returned a consistent positive response for being beneficial in teaching and learning with a mean score of 1.16 across all respondents. Interestingly, most teachers, especially in the age range of 50-59 years use ICT more in their teaching because it is perceived to improve generic skills.

Analysis on teachers' perceptions of ICT in school indicated an overall positive response of over 50% on all variables from respondents and over 80% on three key variables namely, work skills development, skills for living and transferable skills to further education. There was an overall mean of 2.01indicating a strong positive perception. A cross tab analysis highlighted a consistent positive response among respondents with

teaching experience of three different year groups – 1 year, 2-5 years and 5-9 years while the last year group with over 10 years' experience responded more neutral to work skills development through ICT use in school but more positively to skills for living development and transferable skills to FE.

Pupil survey:

Descriptive statistics were calculated on all fourteen items on the pupil questionnaire completed by 1364 pupils who constituted the 39% response rate of return of the questionnaire. The analysis started with the demographics of the respondents and thereafter the access, use and perceptions of ICT use in school and Skills development. The respondents who were from the secondary 3-6 year group, were dominated by male respondents, in school ID 8. The survey displayed information which confirmed that respondents have over 95% access to ICT at home and school respectively which is believed to have contributed to their skills levels of intermediate (54%) and advanced (29%) skills levels respectively. The major skills gain route was identified through a family member as over 50% of respondents gained ICT skills through this route than through school (21%).

Analysis of the applications learned and used in school indicates that the most popular ICT in school was the Power Point (94%, n=1364), followed closely with Word Processing (89%, n=1364), then Spreadsheet (84%, n=1364) and Email (82%, n=1364). However, this contrasts with the sequence for most frequently used ICT which had the internet as the most frequently used ICT, then word processing, email and power point. Further analysis confirms information search on the internet as the main reasons for over

80% of the respondents using ICT, hence the increased frequency of internet use, and exchange of email with friends (21%) as the least reasons for using ICT. Although there are variations in these reasons and capabilities, it all alludes to developing communication skills.

Finally, analysis of the perception of ICT in school which are summarised in 12 statements indicates an overall positive perception of over 50% on 9 out of the 12 variables. Three variables emerged strongly as key variables–'ICT in schools develops work skills', 'ICT in school develops skills for outside school', and 'ICT importance in teaching and learning' due to the percentages in responses. Correlation analysis on the importance of ICT in teaching and skills development for outside school use, returned a strong positive correlation ($r= 0.428$, $p < 0.00$).

Employer survey

The result from the descriptive analysis of the employers' survey containing seventeen items indicated that all respondents have full access to ICT both at home and at the workplace. This results revealed that most of the employees' task were inevitable without ICT which possibly explains why the average skill level was intermediate (41%) with the others at advanced skills level (34%) and expert skills levels (24%) respectively. These skills levels were acquired through special training centres as 'add-ons' to their formal foundational degrees with the least route for ICT skills acquisition being the school. The major reasons for using ICT by these group of employers is mainly for efficiency and accuracy, although the employees with longer years of service tend to use it more for generic skills capability**.**

Section Two: Qualitative results

4.6. Introduction

The aim of the quantitative result analysis in the previous section was to investigate through quantitative descriptive measures, the perceptions of the three cohorts of stakeholders involved in education on the relevance of ICT in school on generic skills development for post school transitions. The result of these three cohorts of participants framed the aims of this section, which explored, through in depth semi structured interview, the views and perceptions of teachers and pupils. The exploration was for teachers to reflect on their activities in school as well as their delivery of teaching in the classroom and ascertain ways for a more positive skills impact on the pupils' transitional needs. This section specifically sought to investigate the views and perceptions of the teachers and pupils on the access and use of ICT in school towards generic skills development. It sought their perceptions on how the CfE is meeting the individual needs of the pupils through ICT, for their post school transition, the factors mitigating the full implementation, the effectiveness of the CfE's policy in schools, and the evaluation measures in place for generic skills development and assessment in schools.

It is hoped that through this medium, a more precise picture of the practicalities of the CfE's 'experiences and outcome' on technologies in schools can be highlighted and thereafter addressed towards a more positive experience for both pupils and teachers. This section will display results of the second and last phase of data collection which is qualitative only. The interviews which occurred in the two sample school schools, had

eighteen teachers and twenty pupil respondents participating respectively. These results will be reported separately to represent teacher and pupils perspectives respectively.

4.7 Thematic Analysis (Teacher Interview)

To assist the reader, the result is stated in a systematic way with Table below displaying the demographics of the eighteen respondents

Table 4. 33: **Teacher Demographics**

Participant identifying code	**Age range**	**Gender**	**Teaching Subject and role**	**Years of service**	**Class levels taught**
T1	30 - 39	**F**	Biology	**5**	S3 –S6
T2	20 - 29	**F**	Computing	**3**	All Levels
T3	20 - 29	**M**	Physics	**1**	S3 – S6
T4	20 - 29	**F**	Biology	**2**	All Levels
T5	50 - 59	**M**	Computing	**20**	S3 – S6
T6	30 - 39	**F**	Biology	**10**	All Levels
T7	30 - 39	**F**	Music	**5**	S1 – S3
T8	20 - 29	**F**	Music / Musical Art	**6**	All Levels
T9	40 - 49	**F**	Principal teacher for technical subjects	**12**	All levels
T10	30 - 39	**F**	Chemistry, Biology and Science	**7**	All levels
T11	40 - 49	**M**	History and geography	**12**	S3 – S6
T12	30 - 39	**F**	Art and Design	**14**	S1 – S3
T13	30 - 39	**F**	English and Principal teacher on support for learning	**12**	All Levels
T14	30 - 39	**F**	English	**8**	All Levels
T15	20 - 29	**M**	Maths	**4**	All Levels
T16	30 - 39	**F**	Modern Language, German and French	**9**	S3 – S6
T17	30 - 39	**F**	Home Economics	**8**	S1 – S3
T18	20 - 29	**M**	Computing teacher	**5**	All Levels

The Table below displays the interview questions asked, the identified and implied codes, evidencing the most frequent words and phrases used by the respondents in their answers. It also represents the supporting statements, and the emerging themes from the interview analysis.

Following from this demographic table is the actual result which is presented under the identified themes. The interview questions aim to answer research question number one (RQ1) – 'What are teachers' perceptions of their explicit use of ICT in teaching towards generic skills development among pupils'. It also addresses the emerging issues emanating from the quantitative data analysis. These issues have been highlighted in the interview questions asked. In answering the interview questions, a total of eight themes were identified as displayed in the table below. These themes were from the results of each of the eight questions asked in the interview and will guide the reports of the respondents (teachers) below. Illustrative excerpts of the relevant interview transcript supporting the result are included in each theme.

Below is an interview matrix table, highlighting the procedure engaged in arriving at the various themes.

Table 4. 34: **Qualifying statements for thematic analysis**

Interview questions	Qualifying statements	Codes	Themes
1. What are your perceptions on the explicit role of ICT in schools as recommended by the Curriculum for excellence, towards developing generic skills among pupils?	1. My perceptions are positive because it is an essential skills for pupils beyond school but I think it is very important that it is differentiated between computing skills and ICT 2. ICT plays a huge and important role in the lives of young pupils. in the perspective of a modern languages, there are huge variety of ICT programs 3. I think it is vital now to use ICT to develop their skills because when they go into the work place; all subjects have a large proportional work on computers now because everything is all computerised in the work place. 4. ….that it gives the teacher a lot more scope that you can work with in terms of the experiences and outcome, it gives choices as well to teachers and it's really up to you or as a school what you want to do.	Perceptions, vital, essential, important, more scope, choices, variety, helpful, much needed, basic skills	Teacher perceptions, autonomy and shared autonomy

2. What forms of ICT do you use in your teaching and why?	1. We often use online games such as language resources of Clap or goot and Zte, and they offer sort of memory game and things like that, grammar, logic skills. We also use SCHOLAR within the whole school 2. I would say in every lesson, I have my interactive board on whether it is specifically for learning outcome or to show animation or short video clips… Some teachers might use a lot of ICT while others might not, depending on the individuals' confidence with ICT. 3. I use it for recording and monitoring progress of pupils. 4. We quite often use the laptops with the pupils in science. we use excel to record data, and plot graphs	Interactive white board, power point, Ms Word, SCHOLAR, SCRATCH, Cubase, Excel, learning outcome, monitoring, recording	Teachers confidence and competence level
3. How do you feel using these ICTs in your teaching?	1. I think it is very important that we teach the breath of skills across different subjects through the application software and use that both in school and perhaps looking at beyond school and at the work place.	Subject knowledge, up, confident, competent, young and trendy,	Pupils Confidence and confidence level.

	2. ….because I am quite young and I definitely do a lot to do with all the latest updates and technological advances 3. some might be older teachers and not quite confident with their ICT 4. In primary it is not a proper subject like History etc. therefore you find that pupils view it as a proper subject in secondary school and they talk about computing as well.		
4. How do you perceive the role of ICT in school towards addressing or meeting the individual pupils' needs for post school transition?	1. In the real world, computer software like Q base is used all the time in recording. So if they are able to use that while in school it means the school is preparing them very well for the real life profession in music. 2. The subject skills are very apparent to us but what we need to do is to develop things like ICT skills that sit across the curriculum and they can use it across all subjects. I think the core of CfE does want to develop these skills 3. I ve got few pupils perhaps that are visually impaired. They use more ICT that other pupils	Changing roles, basic skills, generic skills, individualised delivery	Delivery strategies, variations and best practices

	in the class in other for them to access the curriculum fully. 4. The work place is changing and I think that's one of the things the curriculum has to change with it. And the pupils will voluntarily have to change with it.		
5. How has the current curriculum affected your delivery and work as a teacher towards impacting generic skills?	1. CFE has put in place 'ICT for all' and so that's the responsibility of every teacher to make sure that the ICT skills in each pupils is ok 2. There was issue with many teachers where you used to teach in a standard grade and that's all you had to teach, so now the new CfE will point you towards having very good subject knowledge to teach it effectively. 3. .. as teachers we have to differentiate our work against each pupils, whether they are special education needs, they are higher achiever and whether they are committed to the subject, whether they are focussed or lazy. 4. it has allowed us to revamp our courses	Subject knowledge, delivery variations,	Policy compliance and impacts on the teachers role

6. What skills, in your opinion, will be developed or supported from the ICTs that you are using in teaching?	1. We don't teach them how to do power points but instead we teach them how to do proper presentation. 2. we also do things like team work because that's the skills that is becoming more popular, especially with the smart phone getting smarter 3. The composing skills is part of the course and its fantastic to have that as a component of the course 4. Research and memory skills are acquired in my subject and that can help in employability skills acquisition	Research skills, presentation skills, composing skills, communication skills, employability skills, memory skills, analytical skills, Numeracy skills, literacy skills	Skills development Impact and facilitation
7. What are your perceptions on the assessment and evaluation measures on pupils skills acquisition gain from your delivery?	1. It will be better if there are some moderations…. what would be expected in, what would be an assessed outcome (which is not assessed just now). And if they were goanna be assessed, what would count as a good pass, bad, fail etc. 2. We tend to look at the value rather than evaluate them. If they have made up a power point presentation, after the delivery. The class	Assessment, outcomes, set criteria, feedback, layout, plan, expectations, moderated outcomes	Assessment and Evaluation measures

	gives a feedback on how it went, how the information was displayed, how the spelling was etc. 3. We don't really assess for art and design on a computer.so it does not really apply. Our assessment is done with practical assessed work but they would do that at the very beginning, development of other designers work from the computer and that is purely for research. 4. There are no evaluation measures of ICT in school. the school does not have an organised policy on how to evaluate the impact of ICT		
8. What are the challenges or difficulties faced with the delivery with and through ICT as recommended by the CfE?	1. I think the school itself requires an input of ICT hardware as we are currently sharing ICT suites, works on rotas, being very flexible. 2. Some schools in the region find it difficult to teach composing skills because they have got a boundary where the kids can't play back their recording. 3. it is very difficult for us to get the pupils in the computing room when we want to because	Insufficient computers, class size, poor connection, scheduling problems, boundaries, rotas	Challenges, hindrances, and obstacles towards skills development

	everybody else seems to have the need also same time 4. Computers seem not to be enough for the school.		

This next sub section is the analysis of the interviews which have been grouped into sections for ease of interpretation and understanding. In total there were eight teacher interview questions out of which eight themes were realised. These themes are discussed below.

4.7.1 Teacher perceptions, autonomy and shared autonomy

All the respondents (100%, n=18) perceived positively the benefits of the explicit role of ICT in school, both for the teacher and for the pupil. For some teachers (67%, n=18), their positive perceptions were influenced by their teaching background and subjects (as specialist teachers either in computing, business or technical subjects) which must be delivered through ICT whereas a few other teachers (22%, n=18) do not see the significant role of ICT in their delivery. Instead, they see 'hands-on' practical and experimentation as more relevant. For these group of teachers, they sparingly use ICT in class in order to meet policy compliance.

All the teachers (100%, n=18) acknowledged that they use one form of ICT or another in their teaching. The interactive white board was mentioned as a constant feature of the classroom by all (100%, n=18) teachers, however, 22% (n=18) of teachers mention that it is passive in pupils skills development. A significant number of teachers (67%, n=18) emphasized the inevitable role of ICTs in the current climate and perceived a positive relationship between ICT at school and outside school. The following comments from an interviewee illustrates further.

> *"It is essential for pupils beyond school and so I welcome the CfE having the ICT for all outcomes within it because I think that ICT should be covered in all subjects so that the pupils can get the opportunity to build up the skills not just in one class*

but throughout the whole school'. I think it is very important that we teach the breath of skills across different subjects" (Principal teacher for technical subjects)

In addition to the perceived importance of the explicit role of ICT, Twelve teachers perceive teacher autonomy on content delivery as positive on skills development in pupils. On the Contrary five teachers report that 'time' is more preferable as a factor for generic skills development in addition to teacher autonomy and school culture on content delivery. Among these five teachers, three teachers mention that teachers' autonomy can only impact positively on skills development through subject knowledge, while the other two teachers further highlight the variations in skills acquisitions based on the varying ICTs in school. These quotations illustrates this

'…. because we have now the freedom to design these courses ourselves, we can design them according to the ICTs that we have available to ourselves, (Musical art teacher)

….the good thing about ICT is that there's so much file out there to use and you could choose which skills you want to develop and it would be a specified ICT'(Art and design teacher)

The transcripts further reveal that the respondents acknowledge the nature of the workplace as a variable to be considered in the scope of the teaching at school. This account was given by three teachers. They identified a higher possibility of generic skills development which can occur through regular access and usage, although some subjects require more exposure to ICT and more data handling than others.

"I think it is vital now to use ICT to develop their skills because when they go into the work place, particularly in the field that I manage- Computing subjects,

technical subjects etc. all that subjects have a large proportional work on computers and the work place is computerised now" (Principal teacher)

4.7.2. ICT variations and delivery options

The interviews further highlight the variations in the use and type of ICTs in school. All teachers (100%, n=18) had some commonality in the types of ICT regularly used, while eight teachers mention some uniqueness of choice based on the task and the desired learning outcomes for their different subjects. The Interactive white board was mentioned as a permanent feature of the classroom, with the Power Point, Word processing packages, SCHOLAR (pre developed software) and the internet highlighted as the most frequently used ICTs in school by all teachers. In addition, two teachers use Cubase musical software, one teacher use the Scratch software, (a programming language that makes it easy to create interactive art, stories, simulations, and games – and share those creations online) while two other teachers use [1]PONDS (an online central hub for digital discovery and participation) in addition.

The commonly reported use ranges from presentations (100% of teachers, n=18) to 'report writing' (22% of teachers, n=18), pupil monitoring (11% teachers, n=18), assessment and grading (17% of teachers, n=18) and finally application development (one teacher, n=18). The overall reasons for use was mostly due to confidence and competence levels of the teacher.

[1] Pond is a place where educators can discover content and services, share knowledge and engage with their peers. Pond's comprehensive search function makes it easier for educators to find what they need. Once a new keyword is discovered (via a keyword search or by browsing the content catalogue), you can adapt and use that content to support teaching and then share with others inside the Pond community.

"Some teachers might use a lot of ICT while other might not, depending on the individual's confidence with ICT. Then you try to put it out to the kids and see how they get on. I sometimes think the kids have a better grasp and understanding than i do" (Modern language teacher)

The varieties of the ICTs in school were acknowledged by most respondents (78%, n=18) as positive teaching aids, while a few of them (22%, n=18) described those variations to be distracting and less needed. They mention that the competence and confidence level of the teacher determines the preferred choice of ICT to be used and also the level of engagement within the delivery. Five teachers reported that their department's requirement restricts their competence in some ICTs and its associated skills impact, while four others (n=18) expressed confidence in their subject's ICT skills requirement, as their job couldn't be done without it. These contrasting views are best captured in this quotation below.

….but then as a practical subject we don't really use it, although I use ICT daily to deliver my lessons, it is not necessary "(chemistry, biology and science teacher)

4.7.3 Teachers' Competence and Confidence level

The requirement of the CfE was reported by four teachers as their main reasons for using ICT in class. These teachers reported an impact on their confidence level, having been through different mandatory forms of training on delivery through ICTs. Two teachers reported against the explicit use of ICT in teaching, as implied by the CfE, as it challenges the confidence level of the teacher, authority and class control. As highlighted in this comment:

"I will question a member of staff's expertise in using ICT. It differs btw them. Some people are very rigid in what they use ICT with and only know the basics. There are other members of staff that do not have the expertise or skills to give that experience to pupils" (principal teacher for technical subjects).

Eight teachers report competence to be associated with frequent usage of ICT, while one teacher correlates competence and confidence to age and interest. He also reports that competence and confidence for the use of ICT and its associated skills impact is more among the younger teachers than their older counterparts. The comments below highlight this:

"….because I am quite young and I definitely do a lot with the latest update and technological advances….I feel it basically gives me more depth"(Computing teacher)

"Some might be older teachers and not quite confident with their ICT" (physics teacher)

4.7.4 Best practices and strategies, for post school transitions and meeting individual pupils' needs

Most of the respondents (83%, n=18) perceived the potential for ICT in school to play a huge role on relevant generic skills development for pupils' post school destination than it is currently doing. Three teachers specifically noted that some pupil experience transition to the secondary school with fairly developed skills acquired from home or primary school or both as highlighted by this comment.

> *"They seem to have a good grasp of those things without me having an input in it. It's something I think they develop much earlier in age these days before coming to secondary school" (maths teacher)*

They also acknowledge that these skills may have been in a particular device (for games), although the transferable skills can be useful. They also noted that there are other pupils whose skills needs to be developed from scratch. These discrepancies in skills levels could suggest differentiation in teaching styles.

Over half of the respondents (67%, n=18) were positive that ICT use in school can meet the individual needs of the pupil through devising a personalised delivery strategy that suits each pupil. Six teachers among the twelve said that they will encourage a more structured form of 'hands on' experience within their lessons as this will help the pupils to retain any skills learned. Four teachers (n=18) report that they will prefer to work from the pupils' skills profile to understand their current level of ICT skills and aspirations for secondary school. By doing so, they would have worked alongside the pupils' study skills to fit into his individual needs. While two teachers (n=18) report their preference for

computer software which can render active support and free up time for teachers, one teacher (n=18) mentions his preferred option to make use of personalised tablets for pupils as a way to meet the pupils individualised needs. Another teacher reports that the best approach towards meeting the individual needs of the pupil is for the school to mirror the outside world and work environment and adapt school learning to it. All these variations in delivery strategies are summarised in this comment.

> *"in the real world computer software like Cubase is used all the time in recording. So if the pupils learn and are able to use that at school, then the school would have prepared them well for a profession in real life"(music and musical art teacher)*

Contrastingly three teachers (n=18) mention that the school is currently not meeting the individual pupils' needs in terms of ICT. They reported two reasons for this - disconnection of skills among the year groups and ICT not being a compulsory subject. They also reported about differentiation according to the pupils' distinctive skills levels, different ability levels, commitment to the subject or have special education needs.

4.7.5 Impacts of CfE on the teacher's role

Fourteen teachers (n=18) reported that they have witnessed an increase in responsibility of their work load and tasks with the launching of the CfE, although the majority of the teachers (67%, n=18) like the freedom that it has brought, giving them the opportunity to device several strategies of delivering their lessons and making impact on the pupils. Four teachers (n=18) reported that they are quite happy with the subject knowledge challenge associated with the CfE which has made them to be constantly searching for ways to develop themselves and update their skills. Three teachers (n=18) reported on the ineffectiveness of 'ICT for all' outcome as proposed by the CfE which they say is

practically not realistic. These three teachers mention that their output has been guided by the policy directive which affects their autonomy as teachers and their decisions on the most effective ways of imparting skills to the pupils. The comment below further illustrates this.

> *"every subject is trying hard to incorporate the CfE's outcome, although some subjects are better fit than others" (computing teacher1)*
>
> *…."when a teacher in their subject asks pupils to do an element of an ICT to fulfil an aspect of their subject or the policy, that doesn't mean the pupils are building up skills set because you are not being taught anything additional, you are just using it for what you already know"(computing teacher 2)*

These teachers mention that having shared autonomy inhibits skills development which is a similar outcome to having an expected policy outcome.

4.7.6 Skills development impact and facilitation

Fifteen teachers (n=18) reported on the skills variations that the pupils already have before getting into the secondary school. They acknowledge that the pupils in most cases have a certain level of basic and technical skills developed which makes it possible for them to use the ICT in school. Most of the teachers (78%, n=18) specifically mention presentation and communication skills as being developed and supported from their delivery styles. They claim that these are being enhanced through the frequent use of power point and word processing through their teaching delivery, although they also acknowledge that most of the pupils come in with fairly developed presentation and communication skills. In addition four teachers report that there is team working skills development from their style of teaching delivery, which is accentuated through group work (projects). Three

teachers reported in addition their emphasis on research skills development due to the nature of their subject requirement and linked it to literacy, as expressed in this comment

> *"it helps with the literacy as it helps their use of language as there is spell checks etc. it is also helping them to be creative as well because you are asking them to put it in a certain way, and they are using a creative picture, sounds etc. it also helps to increase their knowledge as they are researching" (English and principal teacher for support for learning)*

Reported by some teachers (17%, n=18) are the analytical skills they consider to be important employability skills. Composing skills was mentioned by two specialist teachers of music as being developed by their specific use of some ICTs in their subject. They report that the improved access to different analytical packages and pre developed software support for teaching can encourage the development of specific skills or a more general skills.

> *"Within our course one of the element is composing skills and using computer software is imperative. With the Cubase software, they are able to record with the instrument and they can mix music with it, listen to their own recording too just like the professionals" (music teacher)*

These group of teachers also report that their activities enhance the memory skills among their pupils which is imperative to their subject

4.7.7 Assessment and evaluation measures

All the teachers (100%, n=18) reported that there are no structured uniform assessments for ICT either as a subject or as a set of skills in schools. However, the CfE technologies, experience and outcome, and in some cases, the SQA guidelines helps them to decide a

chosen strategy which then forms the departmental policies on assessment. All these teachers reported different unique ways of assessing and evaluating skills impact and development from the use of ICT in school. These ranges from self-evaluation by the pupils themselves to formative assessment by the teachers. The majority of the teachers (67%, n=18) attested to using either one out of the two stated above Three other teachers (English teachers) report that their assessment is practically based in line with their subject and make use of memory skills as an evaluation measure. Their assessment is usually project based and tests the effectiveness of skills for the project. They also mentioned that they use the research capability of the pupil as displayed in a given task or piece of work. While two teachers report that they use an informal style of 'two star and a wish' or 'positive comments' as an evaluation tool for ICT skills impact, three others, who are involved in more than one subject reported that they engage a diagnostic testing approach to assessment, in one subject and a star wish in another but have preference for a more structured formal assessment tool.

The diagnostic testing approach in assessment is a distinct form of assessment which helps the teacher to ascertain the students' skill levels, understanding of previous knowledge, as well as background knowledge of a unit lesson or topic that is to be taught. On the other hand, 'two star and a wish' is a strategy for student feedback after formative assessment, which aims to raise the students' standards. The 'two stars' represents areas where the student has excelled and the 'wish' represent areas of development. These strategies vary from teacher to teacher but could have been preferred if there are harmonised formal assessment strategy as revealed by this extract from one of the teacher.

"….it would be better if there are moderations on it. What would be expected in, what would be an assessed outcome, which is not assessed now, and if they were gonna be assessed, what should count a good pass and as fail"

4.7.8 Teachers challenges and difficulties on skills development

All the teachers (100%, n=18) reported that their main challenges in their delivery towards skills development centres around insufficient resources, inadequate resources, time, class size and resource sharing, poor broadband connectivity as well as restricted web sites. They specifically mentioned that there weren't enough computers for access to the pupils and as such they have to take turns. They also report that the class size far out numbers the available computers, thereby dictating the delivery style as pupils are paired on computers which in most cases are not adequate for best practise. Two teachers highlight that their main challenge towards skills development in pupils lies on lack of ownership of 'ICT for all' outcomes. For these teachers, there are no overviews or stock taking of what outcomes should be delivered or achieved in terms of ICT skills within the school, neither is there an evaluation of the process to find out ways to improve the provision. These issues have been summarised in this comment by a teacher:

"*a major hindrance is in the resources, be it time, space or the equipment, where the booking system is in place and that determines who has got the slot, the time to use the ICT. There is no freedom to use it whenever we want to because other teachers and subject want to use the room"*

In addition to these hindrances one teacher reports against an attitudinal behaviour and interference from Council A which compromising his autonomy as a teacher. This was

considered a grave impediment towards realising his skills impacts goal and is further illustrated as thus:

> *"It is a little bit patronising when am not allowed to look at some pages and my pupils are not allowed too, because the Council has blocked it and had considered it inappropriate for some reasons. I find that irritating that someone has taken that choice of decision away from me as they ve found me to be incapable for making decision about my job"(maths teacher)*

In conclusion, the themes deduced from the interview transcript of teachers on their perceptions of generic skill development in school is represented in the image below.

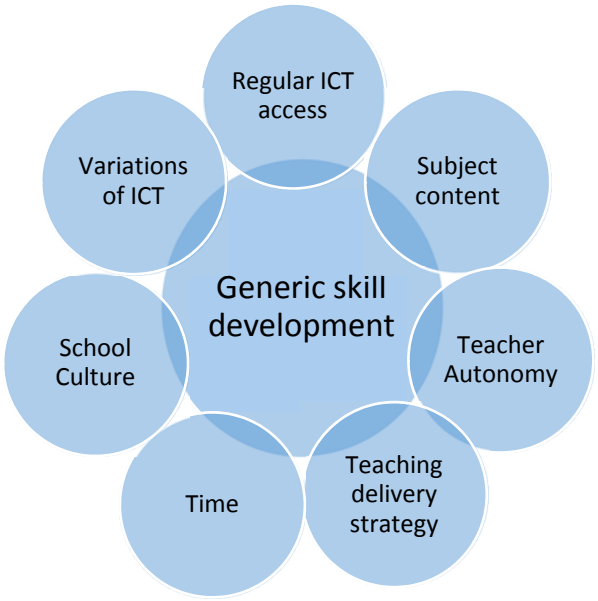

Figure 4. 25 Overarching themes on teachers' perceptions on generic skills development.

4.8 Thematic analysis: Pupils interview result:

The previous section was the qualitative result of the teachers aimed at answering the research question about the perceptions of their ICT use towards generic skills development among pupils. This section will display pupils' qualitative results with the aim to answer research question no 2 (RQ2), what are the pupils' perceptions of the ICT use in school towards developing transferable generic skills for post school transition? This qualitative account will start with the demographic information of the participants followed by a matrix displaying the interview questions asked, the in vivo codes, the supporting statements and also the identified themes from the result.

Table 4. 35: **Demographics of the interview participants**

Participants Identifier code	**Class**	**Gender ***
p1	S6	**M**
p2	S6	**F**
p3	S6	**M**
p4	S6	**F**
p5	S6	**F**
p6	S6	**F**
p7	S6	**F**
p8	S6	**M**
p9	S6	**M**
p10	S6	**F**
p11	S6	**M**
p12	S6	**M**
p13	S6	**F**
p14	S6	**F**
p15	S6	**M**
p16	S6	**M**
p17	S6	**F**
p18	S6	**F**
p19	S6	**M**
p20	S6	M

* P- Pupil, M= Male F= Female.

The demographic information above shows an equal percentage of both male and female participants (50%) respectively. From the transcript of the individual interview, it was observed that some words were frequently used. These words were considered to form the themes of the interview result and are hereby represented in the table below.

Table 4. 36: Qualifying statement for thematic analysis

Questions asked	statements	codes	themes
1. How did you acquire the skills in using ICT?	1. 'Started from home by playing games and mocking about' 2. …From primary school, then home but school taught me the most'	Home, school	Skills gain Route and pupils confidence
2. How is your access to ICTs in school helping you for your post school destination	1. Access is restricted because we don't use it all the time as we should in school' 2. I have study periods but I would say since four years, in class time, there has not been much exposure to computers'.	Restricted access, use,	ICT access, usage and skills gain
3. How do you perceive the delivery of ICT in your school? And how can it be improved?	1. It tends to be delivered more on a stand-alone basis and also across subjects 2. It is taught in the 1st and 2nd year and then again in the 4th year if you chose it as an option.	Stand alone, across, option	Perceptions of ICT delivery in school
4. What type of transferable skills have you developed from the	1. I know how to email people properly and that is developing my communication skills'	Communication, teamwork	Generic skills development in school

use of ICT in School and how important are they to you?	2. …yeah, something like team work, Power point for example develops team work		
5. Has the skills acquired in school been relevant to what you want to do after secondary school?	1. 'With SCRATCH I can design my own characters and I can mimic cartoons and actors. This is good for my filming and animation study 2. I don't think ICT in school is relevant to what I want to do outside school….something to do with sports'	designing	post school destination and skills match
6. What can be done in school to effect a smooth transition for you beyond schools?	1. I would rather have ICT as a compulsory subject to keep up as computers are always changing. 2. 'we have learnt tiny set of the essential skills which are important for living in Year 1 and Y2 and no more…I don't know how realistic this is in real life'	Subject, essential skills	Alternatives to Smooth skills transition

4.8.1 Skills gain routes and pupils confidence

All pupils (n=20) mentioned that they learnt ICT skills from home and school respectively. The majority of the pupils (12, n=20) reports that they first acquired the skills at home through gaming and exploring with the computers. Two pupils (n=20) out of these twelve mention specifically being taught ICT best practice by their Dad who was an IT enthusiast and technician while eight (n=20) other pupils reports that they first acquired ICT skills from school. These eight pupils further recounted that the school route was the most effective route on best ICT practice. These pupils had learnt ICT both from home and school but insist that the school played the most important role in equipping them with the right ICT skills. This is further summarised in this excerpts below:

> *The skills started in primary school, primary 6 and 7 where we started the basics. It was a small primary school and we didn't have many computers. But at secondary school it was a lot focused and we learnt more in the first and second years.it was also the basics too. And we were competing as a class' (S3 male, School ID 6)*

> *…… through classes in school, especially ICT classes in second year. I have computer at home and had some skills prior to coming to school but the school*

> *Played the most part in giving me the most essential skills (S3 Male, School ID 8)*

On the contrary, four pupils reiterate that the home impacted more of the ICT skills in them as they had more time and freedom to practice for longer periods on the computers. This, they claimed had impacted on their confidence level as they rated themselves above the intermediate level.

4.8.2 ICT access at school, and usage

All the pupils report that they have one form of access or the other at school. Half of the respondents (10, n=20) mention that they have restricted access which effectively starts at the second year of studies when they are allowed to choose their subjects. These ten pupils had not chosen computing as a subject for the upper secondary class or any other technical subject which involves more ICT usage. Three out of these ten pupils report that they have improved access at school due to extra time they spend at the library during their free periods. One pupil specifically mentions how disadvantaged it has been for her, not having access to ICT in school for the past three years due to guided choice. The rest of the pupils (10) have full access to ICT at school, starting from their 1st year all through to the 6th year, however they mention that their expectation on the level of use of ICT in class time has not been met and feels restrictive. The following comments illustrates further:

> *'I would say since four years in class time, there has not been much exposure to computers for some subjects like maths and chemistry, I have not had the chance to use computers as I thought I would have in my learning'(S3 female, School ID 8)*

> *'There is access though not very good because the school blocked off some sites for you to visit and that can be frustrating at times when on the internet' (S3 Male, school ID 8)*

4.8.3 ICT delivery and associated skills gain in school

All pupils (twenty) acknowledged the delivery of ICT in their school to be similar. They report that ICT teaching in the 1st and 2nd years in the secondary school are all broad knowledge, comprising of the essentials of ICT which can help with transition into the next class level or in the university. They mention that these stages involve a participatory style of delivery, mostly delivered in the computer laboratory or the IT suite. Contrastingly five pupils' (n=20) highlights the disconnection in skills impact associated with the current form of delivery as three others highlight the associated memory loss. Fourteen pupils report that ICT is delivered across all subjects in their school as a progressive skills, although five pupils highlight that it is more of enhancing the teachers' delivery than impacting skills in pupils. Eight pupils out of these fourteen report that the real experience of skills development and impact is in 'stand-alone' subjects like computing and Business studies, which is more relevant to post-secondary school. This excerpt further illustrates.

> *…I suppose you can say it's a mix and mix of subjects mainly in maths and English, however, you do not really learn much in these classes in terms of ICT, all the skills you learn comes from the single classes like the Computing, Business …' (S3 Female, School ID 6)*

4.8.4 Generic skills development in school for post school destination

All pupils (100%, n=20) acknowledged developing one form of skills or another from their exposure to ICT in school. They report that they have acquired improved presentation, team working and communication skills due to the use of PowerPoint, email and access to the internet. Sixteen pupils (80%, n=20) report that they are certain about their post school destination while four pupils (20%, n=20) were undecided on what to do after secondary school. From the sixteen that have a clear picture of their post school destination, four pupils want to go into apprenticeship and develop their work skills further by learning on the job, nine pupils want to pursue a university career while three pupils want to attend the college. Among this group of sixteen pupils with identified post school destinations, only nine pupils acknowledge the relevance of the ICT skills from school to their post school destination. The rest of the eleven pupils report to the contrary although they acknowledge the capability of the school in the future. Their perceptions are better illustrated in the comment below:

> *"Yes, am positive about ICT use in school can help with transition. Although the current ICTs that am exposed to now will not help me into the university so much" (S3 Male, school ID 6)*

> *"….It's not enough the way the ICT is organised now. if you are able to do the ICT till you get to your fourth year, that would be more positive in terms of acquiring skills for the transition beyond school." (S3 Female, School ID 6)*

From the seven pupils that identified ICT use in school as having relevant transitional skills, two pupils highlighted specifically their acquired skills of creativity from the

Scratch software which is used for animation and voice mimic in programming. This program or software is encountered in computing classes only. These two pupils confirm that their skills are in line with their post school ambition- filming and animation. Other software that is unique to the music class was identified by three pupils. They mention that the Cubase software has been adequately preparing them for a career in music as their identified post school destination while two pupils report that their exposure to the spreadsheet through MS Excel has been responsible for their numeracy and accounting skills, applicable to their post school destination to study accounting and engineering at the university. Logical thinking, problem solving and higher programming were highlighted by two pupils as a transitional skills developed from ICT use in school, specifically from computing and design manufacturing subjects. These skills were considered as appropriate to their post school destination to study engineering and environmental science respectively at a university.

Pupils had varying opinions on the impact of the current styles of delivery of ICT in their school towards transition. All the pupils confirmed that ICT is delivered as a subject in the first and second year as broad general knowledge. After this stage, pupils are expected to choose their subjects and it is at this stage that ICT skills ends for most pupils who have not chosen any of the technical subjects (Computing, business, or graphic communication). Seven pupils who mentioned that they are on one or more of the technical courses highlights that the best experience of ICT skills impact is in the 'stand-alone' subjects, although some forms of ICTs are used across all other subjects. They mentioned that the impact of ICTs in other subjects are too minimal to make any bold

impact for work, HE and living and further expressed dissatisfaction with the current style in school delivery. These comments below further explain their feelings.

> *"It is not enough the way ICT is organised now. We have learnt tiny set of the essential skills which are important for living in year 1 and year 2 and no more…I don't know how realistic this is in real life"(S3 Male, School ID 8)*

> *"We haven't done much of the actual programming. We have from the start had like basic thing to work on" (S3 female, school ID 8)*

Three pupils specifically highlighted the skills disconnection associated with the present style of ICT delivery in school, especially with pupils that have not chosen it as a subject. As an essential skill it comes up in other subjects, but these pupils confirm that they have a residual knowledge or content gap when they encounter ICT in their science assignment – plotting a graph in physics subject. One pupil specifically mentions his dissatisfaction with the delivery style of ICT across all subjects as he feels the skills will not impact much on everyday living. This excerpts further illustrates this:

> *"I think you do end up using computers every so often because you have to. But I don't really think that it's engrained in what we do every day. I don't think that would make us get any more skills that we wouldn't have gained already. Using the ICT regularly in school is just to keep up with technology." (S3 Female, school ID 8)*

On the contrary, two pupils mention their preference of the delivery style across all subjects than having ICT as a specialist subject. They mentioned that even in the specialist class, hands on experience and practical will help retain skills more than just teaching and

talking through it as has been experienced. They reasoned that by having ICT in all subjects, a genuine interest might be developed for taking the subject further, and even beyond the secondary school. The comment below explains further.

> *"I think across subject is good because I think you just teach the ICT in class and don't use it in reality will not really develop any skills. But when you keep using it in all subjects it means that you are learning more and more and that way you keep developing more skills"(S3 male, school ID 6)*

> *"When it was an independent subject, I didn't quite liked it but now that it is joined in every subject, I think it's a lot better." (S3 Female, school ID 8)*

> *"I would rather have ICT as a compulsory subject to keep up as computers are always changing" (S3 male, school ID 6)*

In conclusion, various themes emerged from the pupils' interview transcript on how to effectively develop generic skills. The themes reflected both the hindrances to generic skill development and factors that can accomplish generic skill development. These factors are captured in the diagram below

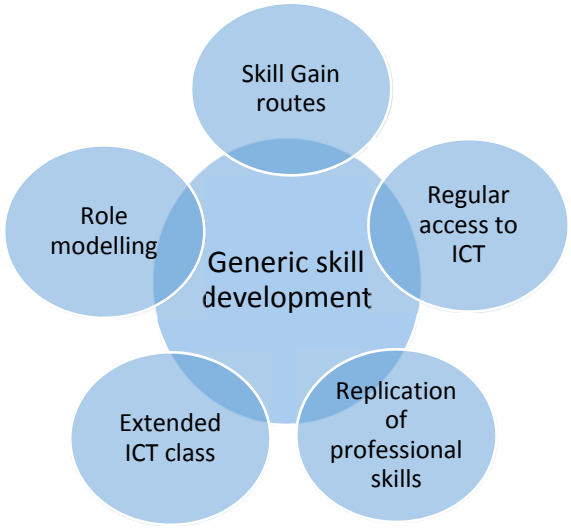

Figure 4. 26 Overarching themes on pupils' perceptions on generic skills development.

4.9 Chapter Summary of Interview results

Overall the perceptions of both teachers and pupils have been captured on generic skills development at school. The subsection below summarises the main overarching themes that emerged from teachers and pupils interview on the factors that will aid generic skills development as well as mitigating factors.

Summary of teachers' interviews:

The general perception of all teachers on the role of ICT use in school towards the development of generic skills in pupils is positive, however, there are teachers who do not agree to the explicit use of ICT in teaching due to their subject demands, their competence and confidence levels of use, but are compelled to use it in order to meet the policy directives on usage. The policy directive was reported as being a barrier on teachers' autonomy, which has an impact on the content delivery and by extension on skills development.

Teachers had varying perceptions on skills development from ICT use. While some teachers believe that generic skills development in pupils will depend on extended time and exposure to ICT in school, others believe that a change in teaching strategy might be more effective. The current practice in school has highlighted that some subjects (computing, business and technical studies) will receive more exposure to ICT than others, and as such result in an improved generic skills development. On the other hand a change in teaching strategy can be considered as a way to meet the personalised learning of pupils. This approach has been identified by teachers to be beneficial

towards meeting the pupils' aims for schooling as well as employability skills acquisition.

Summary of pupils' interview

All pupils positively perceived the impact of ICT on generic skills development, having had their first exposure to ICT from home, however, they also perceive that the school will impart more on generic skills development as there will be a more formally guided approach to acquiring the skills. The potential of generic skills development in school was perceived by the majority of the pupils as feasible but the current restricted access to ICTs in schools is a huge constraint. The varying levels of pupils' generic skills are also traced to the level of exposure to ICT in school as it is believed that the more the pupils are exposed in subjects that demand the use of ICT the better equipped they will be. So for this reasons, there has been a mixed response from pupils as to whether or not to make ICT a compulsory subject in order to develop and sustain generic skills development. Many pupils also see a skills disconnection from the current usage in school and a transitional skills for their future aspiration and as such prefer a reconciliation of generic skills acquired from school to their post school destination.

CHAPTER FIVE: DISCUSSION

5.1 Introduction

This study aims to explore the effectiveness of generic skills development through ICT use in schools. To accomplish this aim, this study explored the perceptions of three cohorts of stakeholders in education on the role of ICT towards generic skills development among pupils for post school transitions (for example, employability, higher and further education, and living). These stakeholders were a cross section of teachers, pupils and employers, selected from one local Council in Scotland. Three research questions guided the study and each research question was addressed to one of the three cohorts of participants respectively. These research questions are restated here as follows.

- Firstly, what are the teachers' perceptions of the explicit use of ICT in teaching towards generic skills development among pupils? This first research question investigated the perceptions of teachers through quantitative and qualitative data on the role of ICT used in teaching, as recommended by the Scottish Government policy on education. The aim was to ascertain the effectiveness of ICT in classroom settings on generic skills development among pupils.
- Secondly, what are the pupils' perceptions of their ICT use in school towards generic skills development for post school transitions? This research question investigated the pupils' perceptions of ICT usage in school towards generic skills development that could be transferred to other settings beyond compulsory school education. These settings include, work, higher and further education, and for living.

- Thirdly, do employers see a 'fit' between the acquired generic skills from school and employability skills? This question investigated whether employers can ascertain from their experiences of working with young school leavers, a balance between the acquired skills gained from school and the required skills for the world of work, the capability of schools in developing sustainable generic skills in pupils and the best place for learning generic skills for work.

Data was collected and analysed using a thematic approach and was further discussed under the three different cohorts. The discussion commenced with the main theme of access and usage of ICT, which was a recurrent theme among the three groups. The issue of access and usage was raised at different points in the study either to acknowledge statements on ICTs improved availability in schools, emphasize the restricted nature of access in schools, or to highlight the fact that availability and access to ICTs has not generated effectiveness as expected, considering the significant government spending in this regard and the skills demands of the 21st century.

Following through, the second major theme focused on skills acquisition, skills routes and generic skills development while the last theme dealt with the difficulties that deter teachers and pupils from making optimal use of ICT in schools. These two broad themes are discussed under the three different cohorts and aimed at answering the three research questions that are addressed to each of these cohorts of stakeholders.

5.2 Teachers perceptions of ICT use in schools

The investigation into teachers' perceptions of ICT in school is discussed here under the following sub – headings, which emanated from the thematic analysis of the survey and interview data.

(a) The effectiveness of teachers' ICT access and usage

(b) Policy impact on skills development in schools and

(c) Teachers perceived difficulties in skills development among pupils

(d) Teachers demographics

5.2.1 The effectiveness of teachers' ICT access and usage

Access to ICT in schools in Scotland has been perceived to be very progressive in growth between 2004 and 2015 (Scottish Government, 2015). To this extent, this study reveals that growth in Scottish schools has been accentuated by the improved availability of ICT equipment (including both software and hardware) and improved Wi-Fi and broadband connections at considerable speed, especially when compared to previous years. Within the context of a government policy on ICT in Scottish schools (Scottish Government, 2004), which recommends explicit permeation of ICT in all subjects, this study highlights, however, that most schools have operated at an optimal level of growth in ICT access and usage.

This study reveals an increase in internet usage at schools among teachers. In a knowledge society as experienced in developed countries, access to the internet and classroom connectivity in an online world of knowledge is an essential feature of the 21st century. Therefore, innovative and effective digital learning aided by access to the internet, has

optimised knowledge and skills development in schools in contemporary times, as this study confirms. The evidence from this study highlights that the internet is very important to generic skills development in schools as all schools involved in this study are connected to the internet. This is further evidenced by a majority of the survey participants (6 out of 8 schools) who were involved in online data collection. This assertion is strengthened by a previous study (Badia, Meneses, Sigalés, and Fàbregues, 2014) demonstrating the importance of frequent access to the internet within and outside school by establishing a strong relationship between frequent access to the internet and teachers' perceived effectiveness of ICT. This implies that the likelihood of ICT to be effectively used could be determined by the level of access gained by the teacher and pupil as well.

A recent publication by the OECD (15th Sept, 2015) which tried to make a connection between pupils, computers and learning evidenced that reading skills were heightened due to web browsing skills of the top performing countries, thereby placing access to the internet as a compulsory condition to participation in the 'connected digitalised 21st Century' (OECD, 2015). However, unreliable or low speed internet connectivity discourages a teacher from using the internet during teaching (Wakefield, 2014), just as the teachers' lack of skills in the device and lack of technical support would further discourage their usage. This is further compounded by restricted access to certain websites by the school authorities as the interview data of this study reveals.

As a standard in Scotland, most classrooms have interactive white boards (IWB) and a broadband connection as permanent features (Scottish Government, 2012) which means that teachers over the years have become familiar with IWBs use and its functionality in

classroom. From a sociocultural perspective, the function of the IWB on pupils' interaction is a recognised cultural tool in the school setting, which is aiding collaborative practice among the pupils and also the co-construction of knowledge. As a cultural tool, it has ensured that the teacher provides a learning environment that meets the culture that the pupils are conversant with, considering their digital nature as 'digital natives' (Prensky, 2001). Similarly too, the pupils as active participants are influenced by the context of this social and cultural environment (Kirkpatrick, 2008) in which they find themselves. The authentic activities that are carried out by the IWB increases the transfer of skills which prepares them for the larger society. However, this same culture in the classroom challenges the position and status of the teacher 'as the more knowledgeable other'.

As recorded in the interview result of this study, in some classes, like English language, science and mathematics, where the IWB has been used very often to enhance teaching, the perceptions of the participants, on its effectiveness have been very positive. For instance, in English classes the display of dynamic texts, translation of visuals into written forms and the improved pronunciation of texts due to the audio capability of the IWB increased the efficiency of its use. Other areas include vocabulary, writing skills, and teaching of annotation in class. For example, in sciences and maths classes, the potential of dynamic visual representation of concepts (i.e, the state of matter- from liquid to solid form and then its visual presentation) as well as manipulation for pupils' comprehension, further increases the positive perceptions of teachers on ICT (IWB). This is opposed to other practical subjects like music where the use of IWB is very minimal. These examples

demonstrate the impact of access on usage and the influence on teachers' enthusiasm for the` use of ICT and by extension, generic skills development at school.

Furthermore, access to ICT in schools has been recurrent in most debates (European Schoolnet 2013) especially concerning barriers to ICT integration in schools, although it can now be said to have been progressively improved. This study identifies that Scottish teachers' access to ICT have improved both at home and at school, thereby making it possible for teachers to improve on their ICT skills within the comfort of their own home and in their own time too. Some early studies on access to ICT in schools recorded insufficient hardware and software, (Mumtaz, 2000) ineffective organisation of ICT equipment by schools, (Albirini, 2006; Cuban, 2001; Dawes, 2001; Jones, 2004), teachers confidence and competence level (Mundy and Kupczynski, 2013) and insufficient time (Buabeng-Andoh, 2012) as factors hindering access.

Over the years, with ICT becoming more ubiquitous, the prominent factors hindering access to ICT have shifted from lack of equipment to restricted access (both to pupils and teachers), teachers' lack of skills and mastery of ICT devices (OECD, 2015), innovative use of ICT and adaptability to the 21st century skills requirement for living. Subsequently, progress has been made in improved availability of resources (Conole, De Laat, Dillon, and Darby, 2008), which indicates growth in this context, but it does not automatically translate to improved access. For example, the increase in the ratio of computers to pupils in school in the UK has continued to improve, especially in the secondary school sector (eLearning Foundation, 2013), even when it is no longer a priority for the present UK Government. However, the situation has not resulted in an increase in teachers' use of ICT

in the classroom. This study finds a positive correlation between teachers' use of ICT in the classroom and student use of ICT, however, issues like restricted access by the Council on certain websites still persists as the findings of this study revealed (page 248). The issue of restriction, though not a complete clamp down for teachers (having access to some but not all sites), can be frustrating thereby preventing effective demonstration and teaching outcomes.

The motives of the local Council and the aim of the restriction on the teachers' part is unclear, since understandably, the restriction on pupils was aimed at protecting them from visiting inappropriate pages and websites. There are other issues like the poor quality of the ICT (hardware and software), lack of technical support, and increased workload of the teacher as a result of new policy introductions from the government, the Scottish 'ICT for all outcome' (Scottish Executive, 2013) which increases the difficulty. All these challenges affect teachers' autonomy and authority, just as they undermine their access to ICT. However, the uniqueness of this present study lies in the synergy that can exists between teachers' optimal ICT access at school and home, its impact on teacher ICT skills development and effectiveness of teaching in classroom setting.

Further findings from this study reveal that teachers have been selective in their choice of ICT for teaching which results in pupils' selective skills development. A lot of factors are considered by the teacher in the choice of ICTs to use to enhance teaching. Some of these factors include, the teachers' desired learning outcomes from the actual teaching and the ICT employed, teachers' competency level in using a particular ICT, pupils participatory ability with the ICT used for demonstration, to mention but a few. These would suggest that, the emphasis by the subject teacher regarding imparting skills to the pupils or

enhancing skills development can be influenced by any of these indicated factors. Usually the learning outcome of a teacher's lesson is the first priority considered when selecting the ICTs that will enhance that particular teaching effort. As would be expected, the teacher's skills level or competency level on the chosen ICT would reflect the pupils' learned ICT skills.

For instance, in this study, the art and design teacher explained that the research skills, which include searching for data online, were more of a priority than other aspects of transferable skills from any ICT, which also forms the focus of the assessment in her subject. This suggests that computers and high speed internet are of high priority in this class because the teaching is time limited hence the importance of the high speed internet. In a typical art and design class, pupils are given a practical project in which they are expected to search for information about some designers and artists. These assignments are carried out on the computers through the internet and involve the import of images which are thereafter used for a valuation report. The essential skills emphasized here are on proper information search strategies using the internet; lay out of an investigation and how to reference the evidence of the search. As would be expected, these would be the emphasis of the teacher as part of the learning outcome for this class. This example demonstrates the active learning component associated with the co-construction of knowledge as features of the sociocultural theory. In this instance, pupils are engaged in the process of learning in order to gain deep understanding of the unit lesson and make a connection between prior knowledge and new knowledge (Miller 2011). Within the sociocultural view, these are 'technical tools', languages and signs (Vygotsky, 1962) which help in the mediation of human activity and knowledge construction. Thus in this

instance, the pupils are actively participating in the understanding of the process of knowledge development using ‘tool’s to mediate communication of new ideas.

On the other hand, the science teacher’s skills priority is more of ‘hands on’ due to the practical nature of the subject which often times requires teaching to be carried out in the laboratory. Hands on activities support the development of practical skills and help to shape pupils’ understanding of scientific concepts and phenomena (SCORE 2011). This style of teaching engages the critical thinking ability of the pupil as it also requires higher order thinking skills. Apart from these, some other skills are developed which are not dependent on any ICTs. These include planning, observation, analysis, evaluation and manipulation of materials and equipment. This is primarily important because most science subjects are empirical, involving experimentation and practical and so these unique skills becomes a priority area for the class teachers to emphasize on. Furthermore, the wider curriculum of employment seems to influence the science school curriculum, as the activities associated with the science industries tend to influence the science subject delivery at school.

In these examples above which are drawn from the study, the teacher’s first assumption was on the relevance of the school education of the young person in the knowledge society and what the pupil will expect at post school transition either at the university or college or work. These assumptions guided the teacher’s actions in finding the best ways to deliver her teaching subject. While the opinion of the science teachers corroborates with the findings of Morris (2010) which posit that secondary school teachers’ frequent use of ICT was still subject directed, the music teachers’ perception of ICT was influenced by the

post school destination use and its associated skills. For the music teacher, ICT is central and key to her subjects and so she mirrors the skills of composing, tonality, recording and play back, that is involved in the outside world of the music profession, to design her subject. In this case, perception of the teacher has been positive and influenced by her external environment (the music professional industry) which in turn emphasizes the composing skills, a generic skill from ICT.

It can then be said from the science point of view, that school use of ICT is influenced from beyond the classroom. The actual nature of the science curriculum and its content is actually determined by what's going on in the world of science and that to a reasonable extent influences the way ICT is used in the classroom. The irony is that in science subjects as well as in technology in particular there is an influx of certain equipment used in the industry like the 3D imaging, laser printing cutters and the USB microscope in schools. These are specialist equipment and very few people can use it. Pupils are unable to use it unless instructed and teachers are sceptical of using them due to its specialist skills requirement and the cost implications, should it break down.

This is further evidenced in the strong correlation analysis recorded between teachers' perceptions of ICT use in school and skills for knowledge society (see chapter 4).
As further identified from the study, The identical factor in these two situations (subject teachers' perceptions) is that both teachers considered the transitional skills beyond school as a priority outcome and has a set of skills in mind to impart in the pupil but the unique factor remains that their teaching subject was the determining factor of the particular skills to be enhanced. This later comment of the music teacher is consistent with findings of

some studies carried out by Altun, Alev, and Yigit, (2009); Keengwe, Onchwari, and Wachira, (2008) and Lau and Sim (2008) which explored the effectiveness of teachers' beliefs and attitudes towards ICT use in classrooms. These studies confirm an attitudinal disposition of teachers on ICT use in school as there is a positive correlation between teachers' level of ICT use and their attitudes towards ICT. This means that teachers' positive perceptions about ICT are an integral factor towards fulfilling the teachers' needs, as well as encouraging them to integrate ICT in the classroom.

The strong correlation between teachers' use of ICT in class and pupils' use of ICT during teaching is highlighted in this study (see pg. 195) This means that as teachers accommodate and encourage the pupils' use of ICT during class, the more will be the likelihood that the pupils will acquire generic skills from such guided use which can be utilized beyond school. At schools, four applications have been flagged up as the most popularly used ICTs in school by teachers amidst all other varieties. These are namely, PowerPoint, word processing, graphics and drawing packages and finally the internet. The reasons behind the selection of these four packages have been traced to convenience, confidence and relevance to the actual teaching outcome. In most instances these packages are used for enhancing the teaching process rather than imparting generic skills in the pupils and with the current teaching styles in Scotland, where ICT is used exclusively across all subjects, pupils come across similar teaching skills in all subjects.

Some studies (Finkelstein and Samsonov, 2008; Root Kustritz, 2014) have reiterated the fact that there are no new skills that are being taught to pupils in these classes because it offers a repetition of the basic skills that the pupils already know and had witnessed across

other subjects. For instance, the use of PowerPoint in class by the teacher as evidenced in this study, indicates that teachers comes with an already made power point presentation to help enhance the teaching. Although this helps with pupil engagement, and active learning by providing structure and direction for the teacher, it doesn't teach the pupil how to organise and deliver an effective presentation, which is a generic skill that can be learned from the use of PowerPoint. Furthermore, most teachers who use the PowerPoint regularly and some other forms of ICT were encouraged by the focus of their study, and their subject specialist background. This implies that the subject knowledge of the teacher, as well as the desired learning outcome that the teacher wants to achieve influences the specific skills embedded in the teaching and learning process. The use of PowerPoint which ranked the highest most popularly used ICT by teachers in schools still dominate the debate on most regular ICTs used in the entire educational system globally.

Previous studies (Root Kustriz, 2014) have confirmed the preference for PowerPoint use in teaching by teachers. This was attributed to the teachers' confidence as a result of high usage over time (Marshall 2012). The high rate of power point use signposts a trend in current technology usage in schools, and also directs attention to the possible generic skills that can be developed from such use that can be transferred to other settings (work or living). Some studies (Farkas and Atkinson, 2005; Finkelstein and Samsonov, 2008 Altman, 2007; and Weissman, 2006) have recorded that teachers engagement in the use of PowerPoint is in fulfilment of the technology requirement in their teaching, while others (Root Kustriz, 2014) have highlighted no significant difference in teaching outcome (e.g exam result) among pupils taught with PowerPoint and those taught without it.

The position of this study neither supports the earlier argument of usage based on teacher confidence nor the argument, based on subject and policy requirement, in the context of skills development. What this study does identify however, is how to link into the communication, presentation and collaboration (team working) skills attributes attached to the PowerPoint usage and thereafter personalise it to the pupils' future aspirations. These attributes which are involved from the planning stages through to the implementation (presentation) stages can be applied at various situations beyond the school, hence the importance of their effectiveness.

This finding contradicts the study by Buabeng-Andoh, (2012) which posits that teachers' main uses of ICT in schools were for assessment and class instruction. Class instruction may be an inclusive reason for ICT use in various schools as confirmed by the findings of this study, the earlier reason of assessment has been a contested area as there is no structure or harmonized framework for assessment of ICT use in Scottish schools. Various schools have their uniquely designed ways of assessing ICT skills within the classroom, such as peer to peer assessment, or teacher's use of praise, star wish, and extra time.

These studies confirm that teachers are using ICT for enhancing their delivery rather than emphasizing the associated skills of collaboration / team work, planning and research skills that could be transferable for post school transitions.

Another finding of this study is that the majority of the teachers learnt ICT as an extra course through informal settings like home and family routes, colleague assistance and trial and error. Among these skill gain routes, the family route was the most popular route for teachers' ICT skills gain. This may be associated with the freedom, autonomy and generosity of time that can come from such informal settings. This finding was further

strengthened through a strong positive correlation (r=0.436) analysis result (see previous chapter, pg198 -199) highlighting the close relationship between family routes and skills level.

5.2.2 Policy impact on skills development in schools

Policy has been perceived by teachers as having the most impact regarding the permeation of ICT in Scottish schools. The policy on ICT in school recommends a broad general knowledge of ICT in the early years of secondary education in class years 1, 2 and 3 (Scottish Govt., 2008) adapted to the needs of the learners in the 21st century. At these stages, ICT is delivered as a compulsory subject in these early year classes and thereafter becomes a selective optional subject to choose from. Teachers perceive, at these latter stages in the secondary school years, that pupils can either have a disconnection in skills acquisition (if they haven't chosen ICT as a course) or have a reinforced skills base (if they have chosen it as a course for the higher classes).

Furthermore, findings from this study reveal that teachers perceive a disconnection between the year groups which, will severely impact skills development for school transitions, as pupils will not be as prepared as they ought to be by the end of the compulsory schooling year. Even as pupils are coming in from the primary schools to the secondary schools, they have some level of generic skills acquired from ICT use which can be developed further. Owing to the fact that there is no log of pupils' transferable skills (or profile) from primary to secondary school, every pupil starts off at the same skills level, in the same class. A recent study (British Council, 2014) carried out in

England on the literacy skills disconnection between primary and secondary school transitions recorded a similar effect of disconnection, thereby highlighting the importance of synergy and cooperation between schools as well as year groups. The survey revealed weakness at the point of transition and a lack of continuity in language learning from primary to secondary school years among pupils. This in turn hampered the introduction of a new language from the teachers' perspective, thereby making it difficult for pupil skills progression. The contrasting element between this study by the British council and the current study is the unique subjects of language (in the case of the British Council study) and all teaching subjects (as in the case of the present study).

In the present study, teachers reveal that a lot of pupils come in from the primary school with some pre-developed generic skills acquired either from their gaming devices at home, unsupervised learning or from school. It is expected that the school should consolidate and update these skills to build upon them, instead the policy adherence of the teacher and the school culture make it difficult either to harness this or discover the potential in these pupils. In addition, teachers' restrictive teaching time in the 1st and 2nd year classes, where the broad general education is delivered in a single period a week, further adds to the difficulties in skill development. This situation could be worse in the upper secondary school years, particularly after the pupils had chosen their subjects for specialization in year 3. It is expected that these pupils who have not chosen ICT as a specialised subject to study will experience skill disconnection whereas there will be a skill progression for the others who have chosen ICT as a subject.

As identified in the literature (BECTA, 2008, and Livingstone, 2012), the emphasis has been more on the impact of ICT on educational attainment than it has been for meeting individual pupils' needs. For a smoother transition and for better personalised learning, it could be more profitable if the pupils' skills strength were identified at an early stage when they are making a transition to the secondary school and then developed further to meet their aspiration?. Previous studies would suggest (Conole, de Laat and Dillon, 2008) that most pupils come from technology rich environment in the UK, as a result of varieties of electronic gadgets and toys and as such 'select an appropriate technology for their personal learning needs' (Morris, 2010a, 2010b). This factor may be worth considering during curriculum and content design that supports learning and makes room for accommodation, but what is currently witnessed is the lack of continuity on the skills that the pupils have already developed either from home or from primary school.

Teacher delivery strategies are also affected as they are determined by the school culture and ethos rather than individual factors (Perrotta, 2013) which is very different among the participating schools. Analysis from the findings of this study reveals that pupils use of ICT in the classroom has the least regular frequency (below average), even when most of the teachers and pupils are at an intermediate, advanced and expert skill levels. These are comfortable skill levels to be able to impact development of skills among pupils. It just appears that the school policy determines what to focus and prioritize on and more often than not, these priorities have not been realistic for optimum good. This may be explained by the school policy's lack of a coherent framework on pupils' skills impact as confirmed by three respondents (teachers). This lack of structure and clarity makes the implementation phase difficult especially as the skills impact of ICT cannot be assessed

formally thus supporting the perception of ICT being better off as a set of tool than as a specific subject.

5.2.3 Teachers perceived difficulties in skills development among pupils

One of the findings of this study is the lack of a coherent structure in schools regarding assessment and evaluation which tends to inhibit the full potential of skill development through ICT use. Teachers are of the opinion that there is room for the schools to do more in impacting generic skills than is currently being done. However, there are still issues with creating an enabling environment for impacting skills in schools. A majority of teachers had acknowledged that Scottish schools are well equipped with ICTs when compared with other developed countries, but there appears to be some recurrent issues dominating the debates on ICT within Scottish schools. Ironically, most of these issues still centre on inadequate resources, time, space, structure and teachers competence attached to their confidence of ICT use. But in spite of all these, there is a possibility at the short term, for teachers to adopt a style that suits their skills needs (Crawford, 2009) considering the limited resources at their disposal.

Furthermore, this study highlights that there are subject specific barriers to the uptake of ICT in the classroom. These specific barriers have resulted in differentiation in skills development for the pupils as teachers are able to apply the resources they consider most appropriate at their disposal, as a way of overcoming the restrictions of embedding ICT in the classroom.

This selective approach however, contradicts the government initiative, 'ICT for all'. The 'ICT for all outcome' (Scottish government 2014) proposed by the CfE is supposed to be the responsibility of all teachers but in most schools within the survey, especially from the findings from the two sample schools of this study, there was a lack of central leadership on this policy and as such is effectively carried out as an extra add-on, by the computing departments. This means that the computing department still has its primary responsibility of developing skills within its own subject areas for Secondary 2 and Secondary 3 year groups, having delivered basic ICT skills to all Secondary 1 classes. The problem with this interplay of policy and practice is that the specific computing outcome is different from the 'ICT for all outcomes'. An example of the specific outcome from the computing class is for pupils to differentiate between the linear and binary search as key aspects of the algorithm.

While the principal computing teacher and her team are in charge of the specific computing outcome, there is no central leadership in the 'ICT for all outcome' initiative in schools, thereby making it impossible to audit the process, access what outcome that is being covered, know the depth covered, how well it is covered, the impact on pupils and what should be done to improve the provision of ICT. The idea behind the 'ICT for all', (Condie, Munro, Muir, and Collins, 2005) just like most government initiatives, is well intentioned but there seems to be a lack of clarity towards achieving its desired aims as well as an accountability problem. In my opinion 'ICT for all' is not achievable as it is not purely down to the teachers' capability alone. The government also hasn't provided the logistics for the smooth implementation of the 'ICT for all' policy for it to happen. There are several mitigating reasons against the uptake and implementation of the policy

by teachers. This includes, inadequate or limited resources, time constraint and a vast differentiation between the unit outcome of teaching and the ICT for all' outcome. Teachers cannot effectively carry out this initiative in these circumstances. They can actually do with some kind of physical support on ground. Besides, some of the teachers are yet to develop the skills and experiences that they are expected to impart to the pupils. The pupils are all unique in terms of character and aspiration and so a personalisation and choice strategy of teaching will be more beneficial towards achieving the reasons for schooling. The fundamental problem perceived with this initiative is the lack of time earmarked specifically and dedicated for 'ICT for all' and inadequate resources (hardware and software). The implications of the lack of central leadership and accountability puts more pressure on the teachers who are currently struggling with inadequate time in order to develop the expected skills to meet the desired learning outcome in their various subject areas, while the scheduling problems with the resources (equipment and laboratory) still persist.

This issue of time has been an extensively identified barrier to the effectiveness of ICT use in school by teachers (Grainger and Tolhurst, 2005; Granger, Morbey, Lotherington, Owston, and Wideman, 2002), although this can be viewed from two perspectives. On one hand is the insufficient time in class for demonstration with the equipment which affect the teachers ability to meet the desired learning outcome, and on the other hand, is the insufficient time periods allocated in schools for the broad general knowledge of skills (as recommended by the (CfE). These issues of time inadequacy challenges the effectiveness in meeting the expected outcome for schooling.

A previous study by Kregor, Bresil, and Fountain (2012) on teachers' perceptions of ICT use in school has highlighted that the teachers' contrasting roles as well as the extra skills demand of the pupils from the curriculum are responsible for the inadequacy of time. In their research, 32% of respondents were less confident and lacking skills in their new roles and as such require extra time to fine tune their skills in preparation for teaching. This is similar to the experiences of the respondents for this current study. Both studies highlight the need for some support that could help to overcome this barrier, or offer better roles of accountability.

5.2.4 Teachers' demographics and ICT use

The findings of this study reveal that ICT usage is not dependent on age and gender but on years of service and on the 'need factor'. The younger teachers are keener on technological functional advances and updating their devices, whereas the older teachers are more focused on the ability of the device to foster generic and transferable skills. The perceptions of the teachers who had ten years of service and over has been identified as being guided by their experiences. Previous research has identified a relationship between ICT use and age, as well as length of service. The general perception recorded by some studies (Tondeur, 2007; Russell, 2007; Inan, 2010; O'Bannon, 2014) indicates a decline and less enthusiasm in ICT usage with older teachers and experienced teachers.

The old debate of Prensky's 'immigrant' and 'native' discourse (2001) supports this assertion too. These studies suggest that younger people are more ICT savvy than the older teachers and as such use ICT more in their teaching. This study validates the earlier findings that age and relative experience of teachers was the differentiating factor in ICT

application (with the least skills competency level rated as intermediate). The younger teachers are more exploratory and interested in the device / equipment than the older teachers. Some other studies have attributed the decline in the use of ICT in teaching to teachers' lack of competence in the particular ICT equipment (Bingimlas, 2009). While these findings may have been the case as at the time of the respective studies being carried out, the findings of this current study refute this assertion as it confirms high usage by most experienced teachers and older teachers. These groups of teachers linked ICT usage to the benefits of skills acquisition and specifically used ICT as a generic skills capability that is transferable to life beyond school. For the younger teachers involved in this study, their reason for use was different as they used ICT more for accuracy, speed and neat presentation of their work.

Further analysis also reveals gender bias on responses relating to skills development. The female teachers perceived more positively the impact of ICT use in school on transferable skills for post school transitions than their male counterparts. This finding is in line with the study by Badia, Meneses, Sigales and Fabrigues (2014) which postulates socio demographics to be influencing teachers' perceptions of ICT effectiveness, as it shows a strong correlation between gender, subject area and teachers perceived effectiveness in ICT use.

5.3 Pupils perception of ICT use in school

The second research question investigated the perception of pupils on the effectiveness of their ICT use in school towards generic skills development for post school destinations. These destinations can be work, higher education or living. The issues of access and usage of ICT was highlighted again as a strong theme among this cohort of participants. The following sub themes emerged, namely, relationship between pupils' home and school, access to ICT, the relationship between access and skills level, the relationship between the forms of ICTs learned in school and their effect on skills development, the most effective route for ICT skills acquisition, and the general perceptions of ICT use in school. The findings were discussed under the following sub sections, namely (1) The interplay of ICTs access and usage on pupils' skills development (2) optimising post school destination through school ICT alignment and (3) Demographic impact on ICT use.

5.3.1 The impact of ICT access, usage and skill routes on generic skill development

In response to access and skills gain, this study posits that most of the pupils gained their ICT skills informally, especially through the home and family routes and also through self-directed means of trial and error rather than through school. This study highlights this route to ICT skills gain as the most popular route which can be more effective if linked to school activities. This route encourages impact as it reduces the friction that can arise from inadequate space and insufficient time. As the natural habitat where the young person spends more of their time other than at school, the home provides the comfort and freedom that the young person needs to be a well-rounded individual. This could be attributed to less restrictions of the home setting which can encourage pupils to be creative

and adventurous. Most pupils are able to spend longer time on the different varieties of ICTs at home than at school, thereby giving room for skills development while at the same time specializing in the particular ICT device (e.g. gaming device). The informal setting of the home is usually relaxing, especially when equipped with many technological devices for the leisure of the child as has been witnessed recently by most homes in the developed countries (Dutton and Blank, 2011).

Livingstone and Helsper (2007) have analysed that having multiple location of access to the internet is of great importance to pupils, just as the quality of the internet connection itself. Of particular importance is home access to the internet (Helsper and Eynon, 2013) due to the benefits that it offers and the associated freedom for exploration. Home internet access has often been shown as encouraging pupils to be involved in various online activities (Eynon and Malmberg, 2011;Facer, 2003; Livingstone and Helsper, 2007), which eventually improves their generic skills development. For many stakeholders (pupils, teachers, parents and employers), the effective use of ICT aimed at equipping pupils to thrive successfully in the knowledge society, will be more sustainable if embedded in the educational system (Selwyn and Husen, 2010).

To this end, ICT skills could be considered as an essential / survival skill for the 21st century and also a key element for contemporary schooling. In support of this notion, the UK government has encouraged families to invest in computers and internet connections at home, based on the belief that pupils with access to online learning at home will do better at school (Selwyn and Husen, 2010).

However, the different devices at home have associated generic skills. Some of the skills are also unique to specific devices, even though most of these skills are functional skills gained from leisure, as has been evidenced in this study and reflected in the pupils' computer skills levels (see chapter 4, sub section 4.2.3). The intermediate (average) skills level shows as the minimum computer skill level possessed by the pupils thereby increasing ability and high confidence. To develop synergy, schools can align the generic skills derived from the ICT use at home, with ICT use in school activities. For a smooth transition to occur, the setting of the school, the culture, and government policy guiding the school curriculum have to be aligned too. If such an alignment occurs, these skills can be channelled more effectively from reception classes at school (Secondary 1) and carried through the school years. Such an effective access and usage of ICT could lead to improved pupil confidence over time. However, some of these skills acquired on a self-taught basis might not be supported at school unless they have followed a structured guidance procedure.

The findings from this study are in contrast to the findings of the longitudinal impact study carried out by BECTA (2010) involving sixty schools in England which investigated pupils and teachers perceptions of ICT, especially network technologies, at home and school. The study findings recognised the benefits of greater autonomy and the opportunity to use computers for longer period that is associated to access and use of ICT. However, it failed to make a connection between the skills developed from the access and its transferability to other settings beyond school. Its focus was solely on improved academic achievement through access to ICT as an educational outcome which differs

with the focus of this study which is based on generic skills transferability to post school destinations.

5.3.2 Optimising post school destination skills

The perceptions of pupils on the role of ICT in school, have been positive on developing generic skills such as communication skills, collaboration skills (team working) and problem solving skills as the findings of this study reveals. These skills have been perceived by the pupils to be better expressed and developed through certain subjects - technical, graphic communication and business studies (see page 255-256, chapter 4) due to the regular exposure and use of ICT in such classes. This finding is further strengthened by the strong correlation between pupils' perceptions of ICT importance and skills development for outside school use (see section 4.26, page 190 of chapter 4) and were perceived positively by pupils as necessary generic skills for post school destination and future aspirations.

While previous studies by Drent and Mellissen (2008), asserts that these skills are better developed through the regular use of internet, email, PowerPoint and other varied interactive media sources, others are concerned with the challenges of coping with the 'restricted' access (Eynon and Malmberg 2011, Ito, Horst, Bittanti, Stephenson, Lange, Pascoe and Martínez, 2009) at school, which can mar pupil skills development in collaboration, communication, problem solving and lifelong learning (Drent and Meelissen, 2008; Wastiau et al., 2013). For many stakeholders (pupils, teachers, parents and employers), these are considered as essential skills of the 21st century and an important outcome of contemporary schooling (Selwyn and Husen, 2010).

This study further identified the internet as the most frequently used ICT in school by pupils. This claim is possible because most schools in Scotland have connectivity to broadband which should aid the interactivity needed for ICT skills development in schools, both among the pupils, and also among schools. The multi-faceted nature of the internet, coupled with the policy recommendation for an explicit permeation in schools, may have contributed to this high frequency of use which alludes to communication skills development. In the UK, families are encouraged by the government to invest in computers and internet connections at home (BECTA, 2010) based on the belief that pupils with access to online learning at home will do better at school. Furthermore, creativity skills can be developed from regular exposure and use of the internet, just as research skills are.

This study further highlights that in schools, most pupils employ the use of the internet mainly for the search of information which supports teaching and learning activities. Although this may sound positive, the sustenance and transferability of the acquired skills from that single use and other skills from the diverse ICTs in school lies in the alignment with the pupils' aspiration and post school destination. Moreover, effective communication with pupils and teachers makes stronger links between schools. This could also be achievable in all other subjects if there is harmonization on the teachers' delivery strategy and school culture.

5.3.3 – Demographics impact on pupils' ICT use

A finding from this study reveals that there were more male participants than female. The domination of the male participants is not surprising as most boys tend to have the flare for technologies and would have had access to different computer games and digital

gadgets at home for their adventures. This practice is shared both at home and at school as boys will naturally want to use the technology more, especially for 'leisure and independent learning' (Papastergiou, 2008) than girls. This perspective is in consonance with the study which found boys to be more responsive than girls (Heemskerk, Brink, Volman, and Ten Dam, 2005; Underwood, 2009) and more frequent users of computers (Melissen and Drent, 2008). Another study (BECTA, 2008) also reveals that boys are naturally interested in technology for its own sake whereas girls might be interested for social collaboration and networking purposes.

However, some early studies by Hayward et al. 2003 and Selwyn and Bullon, 2000 contradicts this position by suggesting that there were no difference at all in the ICT activities undertaken by either boys or girls. This result may have been influenced by the time of the research as well as the context as ICT had not become so ubiquitous by then and has been underutilized in schools and in homes. The uniqueness of the current study's finding is the isolated circumstance in which gender has been viewed across the survey, which is contrasting to the way most previous studies have viewed gender in conjunction with socio-economic status, ethnicity, identity, pedagogy and classroom management.

Another factor is that the perceptions of the participating age group (13 -18years) were tested on general ICT skills across all school activities (technical and academic) and were not given a choice of differentiated applications to test their perceptions on. This gave a holistic picture of their opinion across all ICTs in school and also reflects their skills levels too. In furtherance on the issue of participation, the need for more pupil participation from the age group of 13 to 15 years which is associated with secondary year group 3 and 4 was identified. Incidentally, the life skills curriculums which are first introduced at these

year groups as suggested by the CfE, have resulted in the high enthusiasm of pupils due to the awareness of the importance of such skills. These sets of skills are in high demand in the current century, and are suited for the knowledge economies. It is believed that the current century will demand a very different set of skills and competencies from people in order for them to function effectively at work, at higher education and at leisure times (Cope and Kalantzis, 2010; Dede, 2010) and school pupils are involved in this issue.

The increase in participation among this year group was traced to the associated enthusiasm often experienced with new introductions. However, this enthusiasm fizzles out in later years as evidenced in this study and is replaced by the older year groups (in the transitional classes of year 5) due to student choice of subject for specialization. These older pupils tend to be more engaged in technologies, benefit more from ICT usage and often times are more enthused due to the support they get from their friends (Eynon and Malmberg 2011). This year group has proved to be very proactive and updated on the use of different technologies. However, this study refutes any claim of effective usage based on age, although both age groups have been identified to use ICT in a 'fairly basic way' (Kennedy, Judd, Dalgarno and Waycott, 2010) either to send email, play games, surf the net, chat online, and some other multimedia content.

Regarding the response rate, this study demonstrates that School ID 8 and School ID 6 had the highest and least responses respectively, due to the total number of pupils in the two schools and their distinct locations. While school ID 8 is in an urban highly populated area, school ID 6 is located in a marginally deprived area (MDA) of the council. Interestingly too the latter is as resourceful as the former, and there wasn't an

environmental influence / impact on either of the two schools, while both share a common best practice. This is due to the fact that both schools have an identical source of supply for ICT resources at school but not at home. One unique feature that suggests further investigation into the school is their 'best practice' use of ICTs thereby suggesting that they are more effective users of ICT than the rest of the schools in the area council. Further investigation reveals that School ID 8 has an affiliation with an academy in the USA and delivers generic skill program to the pupils through video conferencing. Through this program, generic skills in the form of digital communication is developed and enhanced among the pupils. There are lots of transferable generic skills from the leadership programme which the school has organised with their counterpart in the USA and the program involves a development and display of acquired generic skills from ICT. While this is the case with school ID 8, School ID 6 has a greater number of pupils who study and work and as such are able to apply generic skills learned from school at the work place while at the same time learning more functional skills on the job. Feedback from these groups of pupils was also able to shape the future of the generic skills process in schools for other pupils.

5.4 Employers perception of ICT in school and generic skills development

This sub section aims to answer the third research question which is – Do employers see a fit in the acquired skills from ICT in school and the generic skills for work. This question was explored with the employers, the third and last cohort of participants in this study. The participation rate of this group of participants was high (87%, n=17), although the total number is very small compared to the number of local employers in the council, and also when compared to the other cohorts involved in this study. Sampling employees through their employers resulted in a low outcome of participation (Green, 2013) as experienced in this survey, and as such generalisation of the result should be applied with caution. The discussions below reflect the findings presented in chapter 4 and have been organised under three themes, similar to the questionnaire. These are (1) Employers perceptions of ICT in education (2) Impact of skills routes on ICT skills gain (3) The impact of school ICT on generic skills development.

5.4.1 Employers' perceptions of ICT in education

The finding of this study reveals some important and positive impressions held by the employers on the usefulness of ICTs in school and suggests that government investments in ICTs for school usage is a credible venture. Conversely, the findings highlight some concerns regarding the priorities that need to be addressed in schools from the employers' perspective, to ensure sustainable development. This study demonstrates that the majority of the study participants could not achieve their task in their respective organisations without ICT, even when their work backgrounds are varied and less technical. This highlights the importance and usefulness of the generic skills obtained from using the

ICTs, especially in the workplace whereby the current practice had made ICT inevitable due to changes in the employment sector. In addition, the more important reasons for using ICT were identified as efficiency, accuracy and quick retrieval of information. The changing nature of work in the contemporary work place has meant that the style of operations will vary from time to time in line with rapid technological developments. This implies that employers should expect to find a need among their staff to acquire new skills and update regularly, the existing one in line with the expectations of the organisation. The acquisition of new skills for employees or even upskilling the existing skills (Hasluck and Armitage, 2011) is an expensive but necessary investment for most employers. In previous year, there has been a reported increase in employee training activities by employers, most of which were 'off the job' (Winterbotham, 2014). Notably too, employers in Scotland recorded a higher level of training of their workforce than the rest of the UK, and this represent a significant increase compared to previous years (Green, 2013).

For instance, the Skills and Employment Surveys (SES) between 2006 and 2012, recorded an increase in the training of recipients from 41% in 2006 to 49% in 2012 (Green, 2013). Similarly, the employer skills survey indicated a rise in spending on training cost from £33.3bn in 2005 to £40.5bn in 2011 (Davies, Gore, Shury, Vivian, Winterbotham, and Constable, S. 2012). Although a lot of employers are involved in this activity as a way forward for their organizations in the interim, they also acknowledge that it is not a sustainable activity (UKCES 2013). There is a time factor as well as the financial resources involved and not all organisations are capable in this regard. The bigger companies might have the funding for training but there is a trade -off between time for

training and production time. For the smaller companies, the impact could be felt more in terms of funding (Farrow, 2010), and loss of business hours. In Scotland, the Employability Fund from the Skills Development Scotland (SDS) has been set up to focus on work experience for young people, while adapting to the local employers differing needs. This is one way to curb the skills mismatch issues within the employment industry as well as investing in young school leavers. However, to equip young school leavers with the right sets of generic skills and improve employability of young school leavers, there is a need for a close relationship between the employers / local businesses and the school. Another way and probably more sustainable, will be to make the employability skills an integral part of the school curriculum, designed with inputs from the local employers.

Another aspect of the study findings pertains to employers perceptions of young school leavers, which focused on poor work skills and wrong attitude to work. A significant proportion of the employers that participated in the study indicated a disparity between the school and the world of work requirement from the skills and attitude displayed by young workers. However, they also perceive positively that work skills are more sustainable if taught at a younger age (see table 4.28 in chapter 4, sub section 4.45,) thus suggesting the need for cooperation/ synergy between the school curriculum designers and the employment establishments. This finding is an improvement to the findings of the UKCES employers' survey of 2011 which has maintained the same trend with the employers' perspective survey of 2010. In these surveys, the general perceptions of employers who engage young school leavers (16 -18 yr. old) were disappointing especially in the areas of attitudes to work and lack of work experience (Keep, 2012). These employers were able to make a distinction between the skills of the 16 year olds

and the 17 year olds. For the younger pupils of 16 years old, it was lack of life experiences and the attitude to work which are classified under the 'personal' management skills, whereas for the 17year olds it was the lack of specific skills and competencies classified as the 'fundamental skills' (Keep 2012).

Although the 2011 UKCES survey identifies similar perceptions with employers in the UKCES 2013 survey, the uniqueness of this study is that years of service had an impact on the perceptions of the employers towards engaging the young worker. As the current study postulates, employers with longer years of service positively perceived the influence of time on the attitude of the young worker and also the relationship between the ICT use in school and skills development for employment (see section 4.45, page 216 and 218), of previous chapter). This group of employers had witnessed the trend of the changes in the employment sector and had experienced the progressive style of skills development among young school leavers, thereby giving room for their willingness to employ the young school leaver based on his ability to develop skills over time.

Furthermore, this study, identified a unique difference between the young school leavers' skills and the capabilities of the young employee. The perception of the employers regarding the young school leavers' skills is different from their capabilities as this current study posits. They positively perceived the latter and negatively perceive the former. A significant number of respondents in past employer surveys opined that the work skills that pupils bring to work are very poor and unsatisfactory. However, three quarters of the same group of employers are still willing to engage young school leavers due to the perceived capabilities of the young school leaver. This implies that there is a positive

perception by the employers on the young school leaver based on the following characteristics - the possibility to mould the young person, enthusiasm, and the willingness of the young to learn. These positive perceptions of pupils' capabilities are evidenced in the present study through the high number of employers who believe that ICT learnt at a younger school age is more sustainable (See table 4.28, page 216 of chapter 4, sub section 4.45) thus indicating support for school as the most suitable location for such learning.

5.4.2 Impact of skills routes to skills gain

Further findings reveal that the most effective route for ICT skills gain for most employers is either through the IT training course, the home learning or through trial and error. This is in addition to the degree upon which the job was offered. These skills routes seem to be very informal but an effective route with positive reflections. Often times learning occur informally, as people stumble on certain positive websites or even learn new skills by chance, just by searching the web. These acquired learning are either developed further where there is a genuine interest or it could be transferred into different settings. The implication of this skill route is that, not only does the finding challenge the educational system but it also highlights the disconnection between school and the world of work. Understandably, each job specification is unique to an organization / establishment, sector and region (Bunt, McAndrew, and Kuechel, 2005), which often times result in initial training after recruitment by employers. The uniqueness of this pattern makes it difficult for pupils to have the right mix of skills required for the job on one hand, and the employers' ability, on the other hand, in engaging the right young school leaver unless the entry work requirements are addressed from a structured point of view, possibly, at school.

5.4.3 The relationship of access to ICT and generic skills development

The findings of this study show the pervasiveness of the internet in the workplace as most of the participants tasks could not be done without ICT (see table 4.27, page 214 of chapter 4). Various ICTs were at a high consumption rate (above average use) within the participating organisation depending on their demands. Applications such as the email and internet were most frequently used. In the UK, over 70% of homes and businesses (OECD 2013) use the internet to interact with public authorities thus demonstrating access to ICT as an important and integral part of the present economy. Access to ICTs in most developed countries has increased tremendously in other to cope with the associated challenges of knowledge economy of the 21st century. To this end, there has been an increase in the need to develop relevant skills, activate skills supply and also make effective use of the current skills in the work places (OECD 2012) in order to deal with the uncertainties of the labour market. This study reveals a strong correlation between employer perception on the usefulness of ICT and work skills development and this supports the OECD 2012 assertion.

5.5 Summary of section

This chapter has discussed the key points that emerged from the collected data in the two phase study involving three cohorts of participants with their unique findings. There were two major themes that emerged from the teachers perception findings. First is the teachers' effectiveness and confidence of using ICT in school to impart generic skills in pupils. This was deemed feasible and practicable. However, the current situation in the school indicates that there are restrictions and factors which inhibits teachers' effectiveness and challenges their autonomy. Some of these factors include school policy, insufficient resources and teachers' selective technology use.

Second, is the demographic impact of teachers' age on generic skills development. While it is generally acknowledged that younger teachers have more regular use of ICT than older teachers, this study highlighted that there are variations in the reasons for use between the two groups of teachers. Generic capability and transferability dominates the reasons for the older teachers' use of ICT while the younger teachers' use of ICT is based on technical capabilities of the device.

From the pupils' result, optimising the post school destination skills through regular ICT use in school was an important quality to the pupils as this formed the major theme among pupils. However, the restricted access to ICT in school was identified as a major factor preventing the development and sustainability of generic skills among pupils. It is established in this study that pupils come from different backgrounds and with different ICT skills levels which can be improved upon and sustained through the school years if the school is efficient. This style will be more effective towards addressing the pupils' aspirations and post school needs.

The Employers perception reveals that they do not see a fit in what is taught in schools and what is expected at the work place, thus suggesting an employer's input in the school curriculum. However, the employers acknowledge their willingness to hire a young school leaver based on his capabilities. There is a distinction made on the skills and capabilities of the 16 year old and the 17 year old and most employers are likely to hire the 17 year old based on his capabilities. This study also reveals the influence of time on generic skills development as most employers with long years' service of 10 years and over are more positive about the influence of time on generic skills development.

The results from these three cohorts of participants in this study have implications for policy and practice and these are discussed in details in the chapter 6.

5.6 Strength and limitations of the study

5.6.1 Strength

The main strength of this study lies in the quality of the participants and the methodology of the study design. These will be indexed as follows:

- The pupils' voices and perspectives were captured as a uniqueness of this study, which also contributed in the rich quality of the data. One of the issues that influenced the researcher to conduct this study was the 'missing voice' of one of the important and active stakeholders in education, the pupils, which was identified during the consultation period of the national policy on education in Scotland - Curriculum for Excellence. The pupils are the beneficiary of any school improvement (content and structure), and are the ones who experience the curriculum and achieve the outcomes of education and as such should be an integral part of the decision making that will affect their education. This study captured the opinion of the pupils at the two sequential phases of the study with inferences from the data analysis used for recommending a framework that will have positive effects on the pupils' choices on post school destinations. The uniqueness of the pupils' perspective was captured as their experiences depended on the curriculum to achieve the outcomes of education.
- As a strength and uniqueness of study, this study was timed at the introduction of the Scottish CfE and followed through its implementation period. This study evaluated the recommendation of the government policy on the explicit permeation of ICT in all teaching subjects and sought to influence the development of generic skills within it. The involvement of all the schools in the Council made it possible for the researcher to gather

different varied opinions from both teachers and pupils on this common issue that affected all schools in the area. However, the impression from the government website is that all schools are fully on the new curriculum and making a smooth transition. The conduct of this study exposed the researcher to the different pace at which the schools were implementing the policy and their varied challenges. The study identified the lack of ownership of government initiatives in schools, especially for monitoring adherence to government policies and their impact. These further enriched the collected data.

- The exploratory sequential methodology of collecting data twice made it possible to capture data using two data collection methods through questionnaires with open ended questions, and semi structured interviews. The first phase of the sequence generated quantitative and qualitative data which enriched the findings of the study and also informed the second phase of the study. This style of methodology also helped in following through the two sample schools that emerged from the analysis of the quantitative data in the first phase as were identified in the first phase of the study and were selected for the second phase of the study, based on best practice.

- The methodological implication of having a sample school design within the exploratory mixed method study was an identified as one of the strengths of the study and a valid approach, especially as these sample schools emerged based on best practice and degree of use of ICT. In addition, most pupils who were on advanced ICT skill levels emerged from the sample schools and so this exploratory sequential methodology offered a good opportunity to capture the pupils' voices on how their use of ICT in school is informing their decision for a post school destination. The pupils' account also served as

a check for the practicalities of the CfE in schools as it helped in reviewing the realities of implementing government policy on explicit ICT use in Scottish schools

- The pragmatic approach to data collection style that was considered most practical and convenient for the participants was upheld throughout the study, leading to high levels of participation and low levels of attrition. A mix of online and face-to-face data collection techniques resulted in higher response rates from the participants, especially from the pupil in the first phase. In some of the schools that were more ICT efficient, the online option was considered as the pupil and the teachers were willing to participate through this medium. Conversely, for schools that were regarded as less ICT efficient or that had lower 'computer -to-pupil ratio' (Morris, 2012), the use of the paper questionnaire was considered more appropriate. This resulted in flexible approach to the participation by the stakeholders.

- Researcher bias and preconceptions were minimised by making data analysis transparent for the reader and also by employing reflexivity and critical self-reflection on the data. Bias and preconception can be an issue during data analysis especially with interview transcript analysis as the tendency for the researcher to interpret findings based on personal view points or preconception might be quite high. For this reason, the researcher employed a peer review of the transcript by another colleague who challenged the researcher's interpretations and conclusions.

5.6.2 Limitation

There were a number of limitations to this study. These are detailed as follows.

- Data collection was time consuming as associated with the exploratory sequential method (Clark and Creswell, 2011) and the fact that it involves data collection in

two separate phases rather than embedded or collected simultaneously. The first phase of study which involved all schools from the Council with varied ICT resources, and staff and pupils capabilities proved more labour intensive as self-administered data sets realised as part of the data collection process were imputed individually onto the SPSS electronic software for analysis. However, the other data set collected through the online questionnaire was easily exported onto SPSS for analysis.

- The Limitation of the second phase to two sample schools may have also been a limitation of the study. Although these two sample schools had emerged from the result analysis of the first phase, they may not have been a typical representation of the other schools in Council A. For instance, the fact that they were the only school as at the time of this study to be involved in international collaboration and a high representatives of pupils with work experiences, does not suggest that the rest of the schools within the council are on the same path to generic skill development.
- Recruitment of participants in the third cohort was selective. The recruitment of the participant within the third group of respondents (the employers) involved in the survey was not done directly by the researcher but by the organisations involved. On approach to the participating organizations, the heads of departments of the participating organizations considered it most appropriate to administer the questionnaires themselves only to managers and departments that work directly with young school leavers. This decision on selective participation raises a bias just as it probably had an impact on the final number of participants in this cohort.

It may have been that these selected participants only understand team dynamics and work place attitudes of their specific unit and not the entire organisation and as such their answers may not have been representative of the organisation. Although some valuable data and analysis emerged, however, caution should be observed in generalizing the result.

- There were limited studies on generic skills within the secondary school sector: The literature search and review returned very limited studies in this sector. Most studies on generic skills were in the higher education sector, and appear to be receiving a greater focus regarding generic skills and employability debate currently, whereas the issue surrounding sustained positive destination should really involve or better still, start from secondary education. With the introduction of life skills at upper secondary schools in Scotland, it then makes it imperative to capture the secondary school pupils' perceptions on how best to sustain a positive destination which meets their aspirations.

  Researcher effect: This affected the study in a different way, especially during the second phase of the study where the participants had the opportunity to meet the researcher. There was a perceived feeling of power imbalance or power dynamics during interaction with the pupils at the second phase, which affected the volume of answers that could have been realised. Most of the pupil interview participants were not very outspoken, a bit shy and could not fully express themselves, with limited expression of answers to the interview questions. It could be that the participants may have been responding to the questions in order to please the researcher, (i.e a strange adult) and yet being cautious with how much information

they could divulge. This may have been due to the fact that they were new to interview and not very familiar with the researcher.

- The issue of power dynamics cannot be completely ruled out in most studies involving younger participants (Shaw, Brady, and Davey, 2011). It can be managed by employing some other strategies that could stimulate as well as facilitate interactions with pupils and further reduce the impact on their consent. Some of these strategies can include pictures and mind map. Future studies might consider exploring this in more depth.

  Another impact of the researcher effect was exhibited when most participants (teachers), who had consented on paper to participate in the study earlier on, changed their mind at the last moment when they made contact with the researcher. Some teachers were uncomfortable to divulge certain sensitive information to the researcher (who was an outsider to the school) especially when it has to do with school policy involving some high authorities and government officials.
- The convenience sampling of participants made it impossible for statistical transferability and generalisation since this type of sampling does not provide a group of individuals' representation of the entire population (Creswell, 2008). However it was necessary for the researcher to adopt this style of sampling due to personal convenience (like location) and cost effectiveness while demonstrating an understanding of the study protocols.
- Lack of inter rated reliability for the research instrument: The importance of reliability in research cannot be over looked as it is central to the evaluation of the research instruments. This is because it fulfils the question of consistency over

time (through test-retest) and internal consistency (through alpha coefficient) depending on the research type. However in this study the instruments used in the quantitative stage had applied the test retest approach to consistency during the pilot study and again during the actual study on one hand, and a peer review of the interview transcript on the other hand. However, the interview transcript may have benefited more from further checks with the respondents and inter rater reliability may have been deemed necessary as a check for consistency of result, considering the exploratory nature of the study and also to address any issues relating to bias. This limitation is worth considering as a recommendation for further studies.

CHAPTER SIX: CONCLUSION AND RECOMMENDATION.

6.1 Conclusion.

This study sought to explore the impact of ICT on generic skills development among pupils in schools for an effective post school transition to positive destinations, by assessing the perceptions of teachers, pupils and employers as active stakeholders in education. Generic skills and ICT in education are two broad areas that are currently receiving regular attention, especially within the employment sector and academic institutions, and as such the issue of generic skills demands and the potentials of ICT in schools cannot be over emphasized considering the ongoing debates and many studies in these areas. However, it is my observation that few studies have specifically looked at the synergy of these two broad areas. Particularly, within Scottish compulsory education, even with the high level of financial commitment from the Scottish Government, there have been very limited studies on generic skills, thus making the knowledge of generic skills 'very patchy' (Condie and Munro 2007), especially in the compulsory school sector. This study has been able to explore these two broad topics by investigating the perceptions of the three different stakeholders in education – the teachers, pupils and employers.

This study conducted a literature search systematically on the conceptualisation of generic skills and assessed the feasibility, as well as the impact of the Scottish Government's directive on the explicit use of ICT in teaching and learning in schools. The review revealed the gaps between the acquired generic skills from school and the required skills for post school destinations. It also identified the exclusion of pupils' voices on the decision that affects the outcome of compulsory education.

The results of the literature search and review laid the foundation for the developed research instruments for data collection and analysis. Based on the derived research questions, this study employed questionnaires and interviews as data collection instruments which focused on the perspectives, experiences and expectations of the teachers, pupils and employers on the role of ICT on generic skills development. These three cohorts of participants for the study expressed positive perceptions on the impact of ICT on generic skills development. However, there were instances where perceptions differed about the impact of ICT on the development of generic skills among the three cohorts of participants. This was due to their unique requirements for generic skills.

This study explored and highlighted the need to particularly close the gap between employers' expectations of generic skills for work and pupils' acquired generic skills from school. It also identified the mismatch between pupils' acquired skills from school and the required skills for their desired positive destinations and concludes by suggesting the need for workplace practice to inform the school curriculum especially for upper secondary school curricula. It also suggests for the pupils' voices to be captured in the curriculum design as that will be effective in realising their reasons for schooling.

Apart from the contributions which have been discussed in the previous chapters, this study has uniquely captured the pupils' voices on the important outcome of schooling, which is rather a priority for developing relevant generic skills in line with their aspirations for post school destinations. It is observed that pupils' voices which were excluded from previous studies, including the Scottish national debate on education, prior to the launching of the new Scottish Curriculum (CfE), has been accommodated in this

study. Affirming other studies, it would appear that most pupils had an intermediate skills level or higher, thus demonstrating effective routes for generic skills acquisition. The findings of this study have indicated uniquely that the effective routes to generic skills development among pupils are the home and school respectively, which suggests a synergy between the two for sustainability. However the restriction on ICT access at school appears to be a hindrance to the full potentials of developing generic skills at school. This factor was also found to be shared by teachers who believed that their autonomy was challenged through restricted access and the insufficient resources within the school. This study explored these issues in depth through different routes to arrive at pragmatic ways for generic skills development in schools.

The need for personalised learning on generic skill acquisition within the upper secondary school, was a significant finding of this study. As the result suggests, the pupils will benefit more from a tailored generic skills development in line with their ability and aspirations. By implication, this will affect the teaching delivery strategy and suggests ways to create a paradigm shift among teachers towards generic skills development from the current teaching delivery strategy. Furthermore, this extends the discussion on personalisation as documented by John and Wheeler (2012) on the need for a 'just for me' approach to learning which is feasible and 'predicated on the power of new technologies to drive the initiative' (John and Wheeler, 2012, p. 32). The current recommendation by the Scottish Government for an explicit use of ICT in schools further offers a chance for the realisation of this plan.

From the teachers' perspective, generic skills development cannot only come from ICT use or teaching delivery done through ICT, as the current Scottish education policy

recommends, but can come from other teaching delivery styles. This perspective of teachers, supports the real meaning of the word 'generic' which implies generality or universality. This study has demonstrated that in order to impart these desired generic skills in school, teachers' autonomy is important especially on the decision for planning and negotiations on how to effectively arrive at the learning outcomes for schooling. Furthermore, this study has demonstrated that the lack of policy accountability in schools may have contributed to the ineffectiveness of a well-intended policy in Scottish schools. For instance, the 'ICT for all' policy directive, which was in principle every teacher's responsibility, but in practice not feasible and could only be delivered by the computing department in most schools, either due to expertise or resource sharing issues.

Overall, this study has expanded the author's knowledge on the need for embedding generic skills in the school curriculum, in line with the perceptions of the three stakeholders that participated in this study. It has revealed the importance of aligning generic skills developments with pupils' post school destination' and has addressed the importance of collaboration with stakeholders towards informing design, content and delivery of lessons that support, as well as enhance generic skills development. Empowering teachers to be responsible for their approach on how best to incorporate generic skills development is critical and as such their autonomy is vital.

6.2 Implications and recommendation for practice and policy

The main objective of this study was to highlight the importance of generic skills and to generate information that will be useful for the development and sustainability of generic skills for post school transitions, especially among secondary school pupils. As the

concept of generic skills has been widely debated due to the requirement of the knowledge society and 21st century, the need for a different set of skills to enable people to function effectively at home, work and school (Dede, 2007; Kalantzis and Cope, 2008) became necessary. This study has revealed that there are different skills requirements and capabilities for different cohorts and as such different levels of generic skills demands. Another important findings of this study is the discrepancies in the perceptions of the stakeholders in education due to differences in the distinctive generic skills requirements. Incorporating these findings would likely improve the practice in schools in order to meet the pupils' aims for schooling, and the employers' requirements for an effective work place. Hence this study suggested recommendations for teachers and pupils, as major stakeholders, in compulsory education and the employers as follows.

6.2.1 Teachers and Pupils

A need for a change or differentiation in the delivery of teaching is evident, taking into consideration the uniqueness of the pupils, their individual abilities and socio economic backgrounds which calls for individualized or personalised learning. At inception classes into the secondary school, pupils are coming in with different ICT skills levels and different experiences. A skills log seems to be necessary at this level to identify the skills strength of the pupils and match it with a corresponding learning style that is more effective based on pupil requirements and abilities. From a sociocultural view, this is desirable as learning is most successful when contextualised and conducted on a 'need' basis, in order to achieve the desired outcome for schooling (DFES, 2004). The record should be examined again in the 3rd year, when the pupil is making a choice of subjects as the school policy / CfE demands, in order to identify and match the skills strength with

the chosen subjects. As John and Wheeler (2012) purport, it is important at this point for a negotiation between pupils and teachers on the decision for a preferred and effective learning route in the co-construction of knowledge. Within Vygotsky (1978) sociocultural theory, the social, dialogic and co-constructive nature of learning is central. However it recognises the teacher as the 'more knowledgeable other' responsible for the mediation of learning. The teacher through interaction with pupils, identifies the zone of proximal development in the pupils, and also when best to render support for the pupils' optimum achievement.

This is further illustrated in figure 6.27 below.

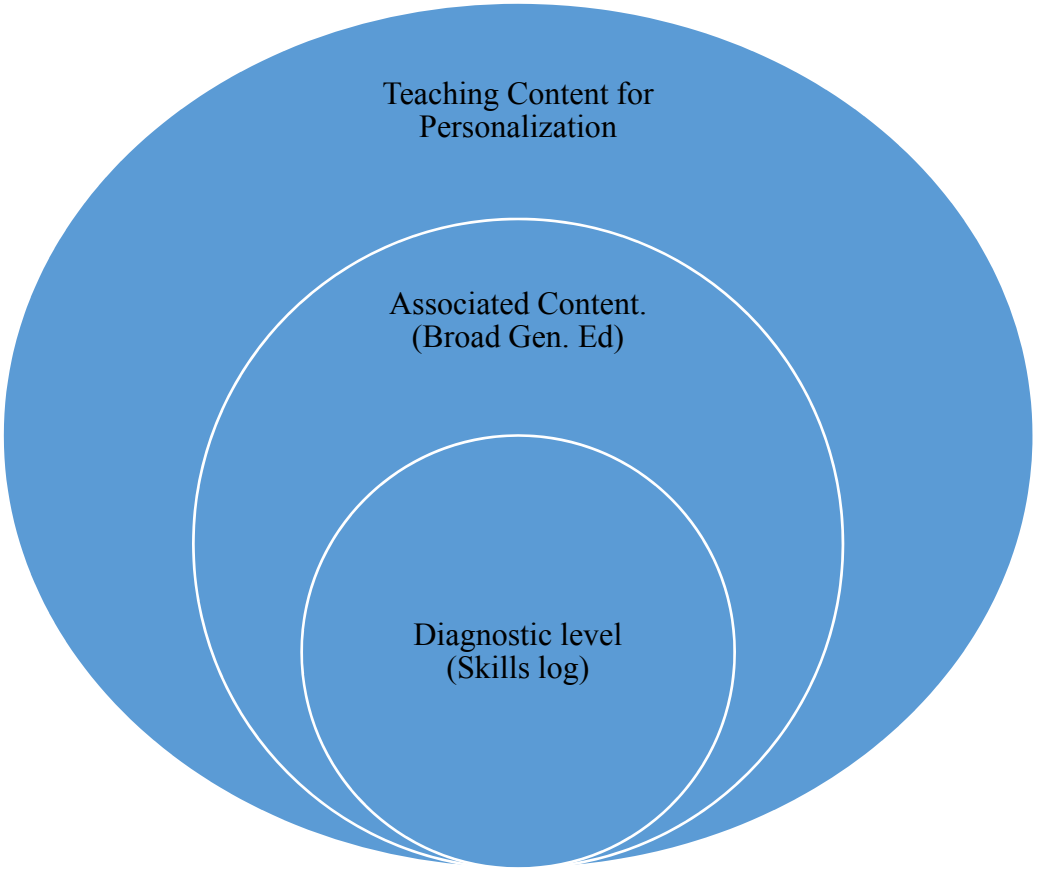

Figure 6. 27 Development strategy for generic skills among pupils.

Notably, the CfE ‘s broad general education is more evident in S1 –S3 classes where there are broad range of subjects and ideas as part of the curriculum, different from the S4-S6 curriculum which is narrow and differentiated in many schools. This contradicts as well as challenges the statement on the general aim of the CfE offering ‘a broad general education from age 3 till 18 years’ (presumably to S6) and more so, the development of the ‘four capacities’- (Successful learner, Confident individual, responsible citizens, and effective contributors) proposed by the CfE for the pupil (Scottish Government., 2008). In addition, the restrictive nature of the upper secondary school curriculum makes it difficult for these aims and capacities to be realised. These restrictions which have been identified in the educational experiences can also result in limited opportunities for the pupils. For a positive and sustained post school destination of 18 year olds, an appropriate balance between academic and generic skills learning needs to be maintained.

Another approach towards the development of generic skills should be in the teaching strategy whereby generic skill can be integrated as a component of a subject. By implication, this means that a generic skill is what is taught and not what is learned. Therefore, the teaching process should focus on the ‘how’ and not the ‘what’ (Barrie, 2007) is being taught as a way to encourage the development of generic skills. Conversely, teaching content should be designed to accommodate the teaching of generic skills either as a standalone or as a discrete subject, as the findings of this study suggest. If taught as a standalone, the focus should be on teaching and not learning, with

focus on the teaching process as illustrated further in figure 6.28 below.

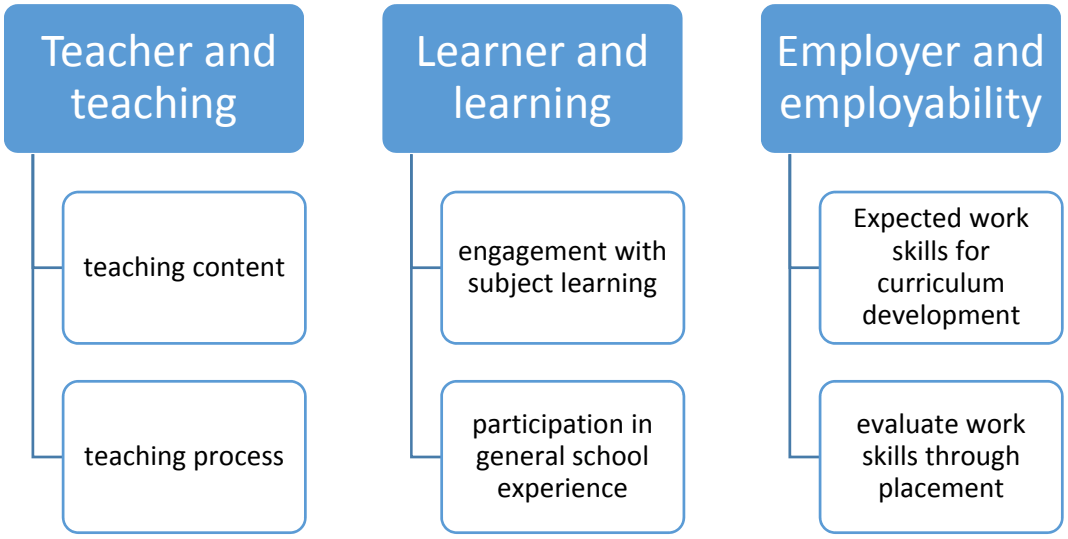

Figure 6. 28 Teacher, Learner and Employer focus.
Adapted from Barrie, (2007)

The need to harmonise the curriculum content of each school subject for the upper secondary school years to accommodate work placement for every student in the year group seems necessary. This will ensure that all pupils in a particular year group and class have similar work experiences and work place knowledge which will be improved upon yearly as they progress from S4 to S6. This will also complement the government's decision to introduce life skills from upper secondary school classes.

As the findings of this study reveals, the lack of work attitude among young people was an issue of concern among the participating employers. These findings were further justified by the few responses from a small proportion of the participating pupils (20%,

n=20) who have work experiences while studying and were positive about their experiences. It is also important to note that these work experiences were voluntary and mostly carried out during the weekends and holiday periods by the pupils. What this result suggests is that employability or a work based curriculum is highly desirable as an integral part of the curriculum. This aspect of the curriculum will be best administered at the transitional classes of S5 and S6 and in circumstances where pupils prefer to take an extended year in school. Such group of pupils should be encouraged to have a hands on work experience monitored and moderated by the school (Nwaozuzu, 2014). This will ensure that the right attitude to work and employability skills are developed at an early stage and will give the young person a comfortable start in a positive destination (employment). These experiences are positive for generic skills development and work place attitude and could be beneficial to a larger proportion of pupils when embedded in the curriculum.

6.2.2 Employers

The findings in this study have implications for employers especially on their expectations of the young school leaver's generic skills capabilities for the workplace. There is a significant but consistent mismatch between what is taught in school and what is expected in the workplace thereby making young people poorly prepared for work and often times resulting in employers' dissatisfaction (Felstead and Green, 2008; Winterbotham, 2014, Confederation of British Industry, 2015). This outcome has led to some empirical studies investigating the 'world of work' in the 21st century and the required skills (Casner-Lotto and Barrington, 2006, Achieve, 2005). However, most of these investigations had been

more on university graduates than young school leavers in general, even though young school leavers are actively involved in employment.

The employers in this study placed a high emphasis on communication skills (especially on speed and accuracy) as attributes that can be developed from ICT use in school. The pupils on the other hand also emphasized the importance of the same skills. However, the differing environment and its associated culture reveals some incongruences in that particular skill. Whereas the school environment will require pupils communication skills to emphasize written communication, the work environment will require emphasis on oral communication, which is often 'spurious, quick and informal' (Leveson, 2000). For harmonization, it will be more effective for the employer to work with the school on the exact expectations of generic skills that are most relevant to the work sector in order to improve the long standing disparity between educational outcomes and employer expectation. Furthermore, it will suggest an embedding of employability skills as an integral part of the school curriculum.

6.3 Recommendation for policy

Firstly, the findings of this study suggest a recommendation for an education policy document to accommodate a curriculum for the extended school year for 18 year old. The Scottish Government has proposed an extended school year in order to accommodate pupils who are yet to get a placement in further or higher education as well as those who have opted to have a gap year. As this study reveals, some of the pupil participants were either undecided on their post school destinations or certain for a gap year, (see Chapter 4, sub section 4.84, on pg. 256). It will be worthwhile and

enriching for these pupils to benefit from a work related curriculum for their gap year, if they are to remain in compulsory education, as this will help towards developing or sustaining the generic skills acquired while schooling. This will also ensure that they are able to acquire relevant generic skills for the educational sector or employment sector should they decide to choose the apprenticeship route or the further or higher education route.

Secondly, the implication of the current curriculum which recommends an explicit permeation of ICT in all teaching subject suggests an extended access to the internet both at school and at home. By extension, this suggests a call for government support for the provision of ICT at homes and also a support for the effectiveness of these devices. The result as displayed in this study which shows a positive correlation between school access and home access further supports this call. This study recommends support for the provision of ICT and also training for parents in order to support the generic skill training of the pupil from school.

6.4 Recommendation for future research

The literature review and this study revealed potential areas for further research in generic skills development among pupils from the current study. However the more relevant issues are detailed below. The findings of this study were drawn from the perceptions of teachers, pupils and employers from one council in Scotland, thereby preventing generalisation across the rest of the country.

- Further exploration of this topic, with wider access, is necessary to check that the perceptions held by teachers, pupils and employers on generic skills development

from ICT in one council, is affirmed in all other parts of the country. The involvement of more than one council will mean more data and findings but due to time and financial constraint, this study has been limited to one council.

- Future studies may carry out a longitudinal evaluation of the generic skills developed from ICT use by investigating the effectiveness of the transfer of the developed generic skills from individual subjects in schools to post school settings. This will help to identify the specific generic skills that are unique to particular subjects and monitor the effectiveness of the post school transition of these skills into work, higher education and living. The outcome will help in providing effective support for generic skills development in schools.
- Future research may consider exploring other strategies of data collection involving young people, with less physical contact with the researcher. This will reduce the impact of the researcher's presence on the pupils' consent while ensuring an accurate representation of their feelings and perceptions of a phenomena. Some areas for exploration which can stimulate interactions include mind maps and pictures. These sources of data collection techniques can offer enriching accounts from young people.
- As the findings of this study reflect the perceptions of a particular age group (14-18) in upper secondary school on generic skills development, future studies might consider a comparative study between these age group and the 19-21 year old in the further or higher education, in order to assess if there is homogeneity in their perceptions of generic skills and outcomes for schooling.

To sum up, all these recommendations will need research to evaluate their impact and adapt accordingly.

6.5. Reflection:

Reflecting back on my doctoral journey, especially with regards to this thesis, I realised that all public schools in Scotland are not homogenous in their modes of operation, even though they all operate one curriculum and are resourced identically from local councils. The data collection procedure suggests that there is autonomy in the operation of schools which are unique to each school within the council. However, this explicit autonomy is not experienced by the teachers and possibly accounts for the discrepancies and disunity experienced between the different subject groups. From this study, an example is the relationship between the computing and ICT subjects, and other technical subjects which I think has more capability for generic skills development for work purposes. There is also a potentially thin line between ICT and higher photography (a school subject). With ICT skills being a requisite condition for participation in the photography class due to its technical skills demands, it may be necessary to have a close relationship between the two subjects as it will enhance the development of employability skills, thus making the pupils more attractive for employment.

Reflecting further on the pupils' perceptions of ICT as a subject, I think the low numbers of school pupils offering ICT as a subject for certification in S4 are due to their perceptions of the subject and the way they have been presented in schools. In primary schools, for instance, pupils are used to having stand-alone subjects like History, expressive Arts etc, and then ICT being used as a set of skills. This is different in secondary school where ICT is also a certificate subject from S4 and the same pupils who would have been learning the subject in the broad general education (as proposed

by the CfE) from S1 to S3, are faced with the option to continue having the subject or not. This situation, in my opinion, can create confusion (as I did observe) and can affect the young people's post school transitions plans. If the broad general education as proposed by the CfE is to be fully implemented, then there is a suggestion that ICT will be across all levels in secondary education. This move could lead to developed and sustained employability skills from ICT needed for the modern society.

As at the time of data collection, the implementation of the CfE was commencing at a developmental degrees and pace in all the schools in the council. I believe that the outcome of the data collected from the schools in this study may have been affected by this, in addition to the teachers increased work load and the lack of accountability on government policies within the school. Reflecting back, I am thinking that if data collection were extended to accommodate the perceptions of lecturers in further education, (which is one of the post school destinations), the result would be more diverse and in a position to justify a harmonization of the school curriculum content for S6 and the first years in college. It will also make for effective generic skills transition from school to college.

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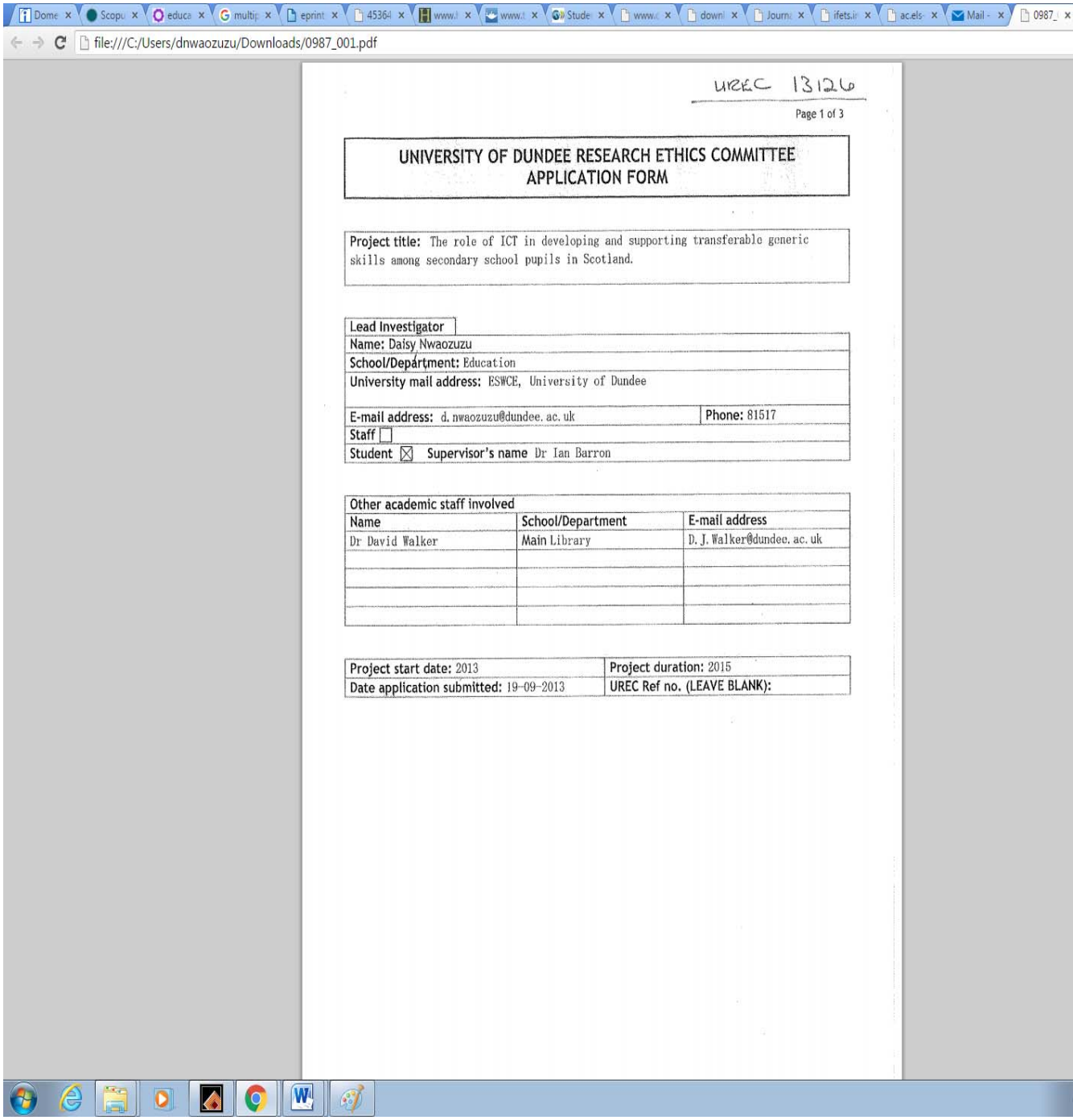
List of Appendixes.

Appendix A. - Approved ethics application form



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UREC 13126

Page 1 of 3

UNIVERSITY OF DUNDEE RESEARCH ETHICS COMMITTEE APPLICATION FORM

Project title: The role of ICT in developing and supporting transferable generic skills among secondary school pupils in Scotland.

Lead Investigator

Name: Daisy Nwaozuzu

School/Department: Education

University mail address: ESWCE, University of Dundee

E-mail address: d.nwaozuzu@dundee.ac.uk **Phone:** 81517

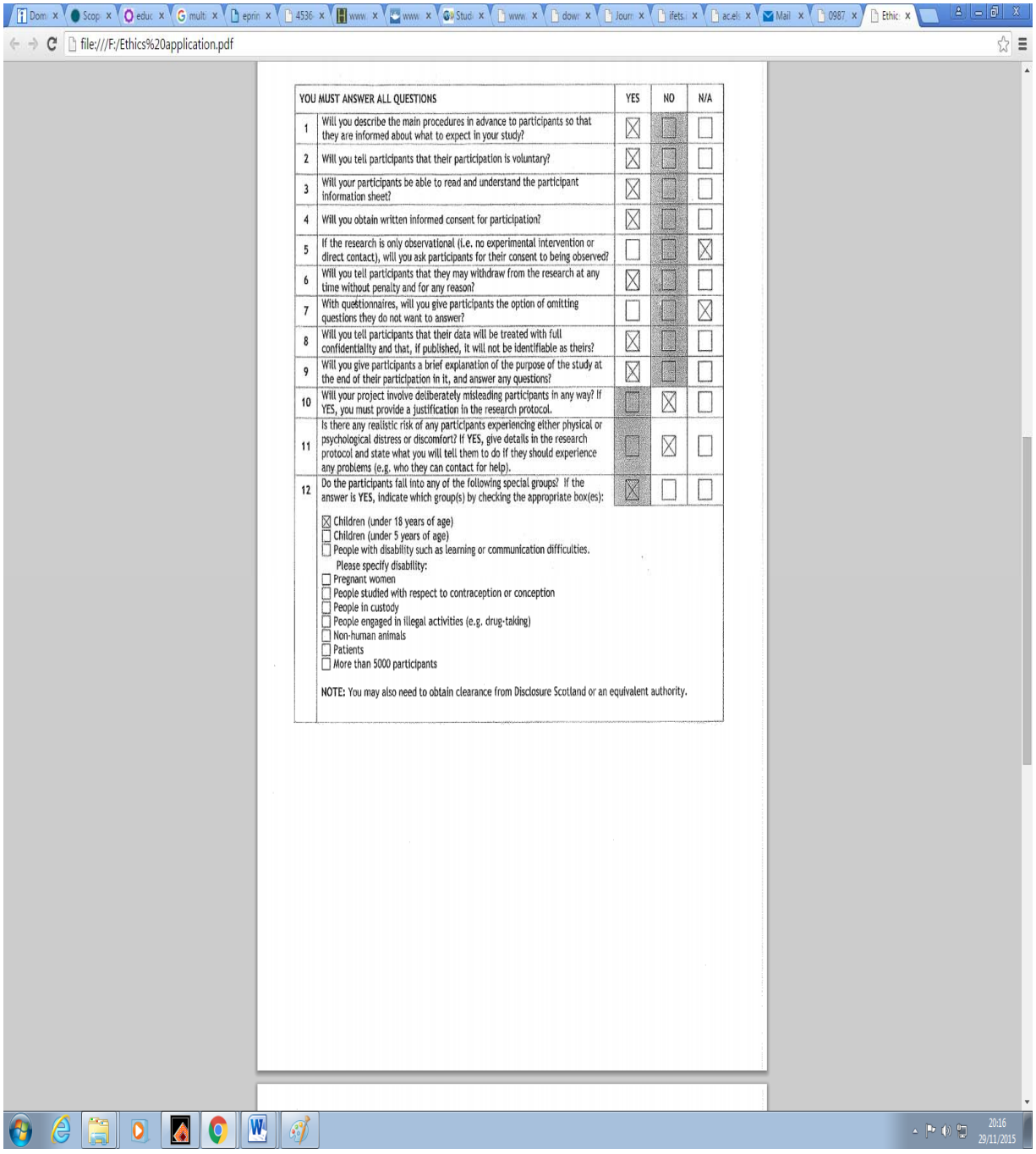
Staff ☐

Student ☒ **Supervisor's name** Dr Ian Barron

Other academic staff involved

Name	School/Department	E-mail address
Dr David Walker	Main Library	D.J.Walker@dundee.ac.uk

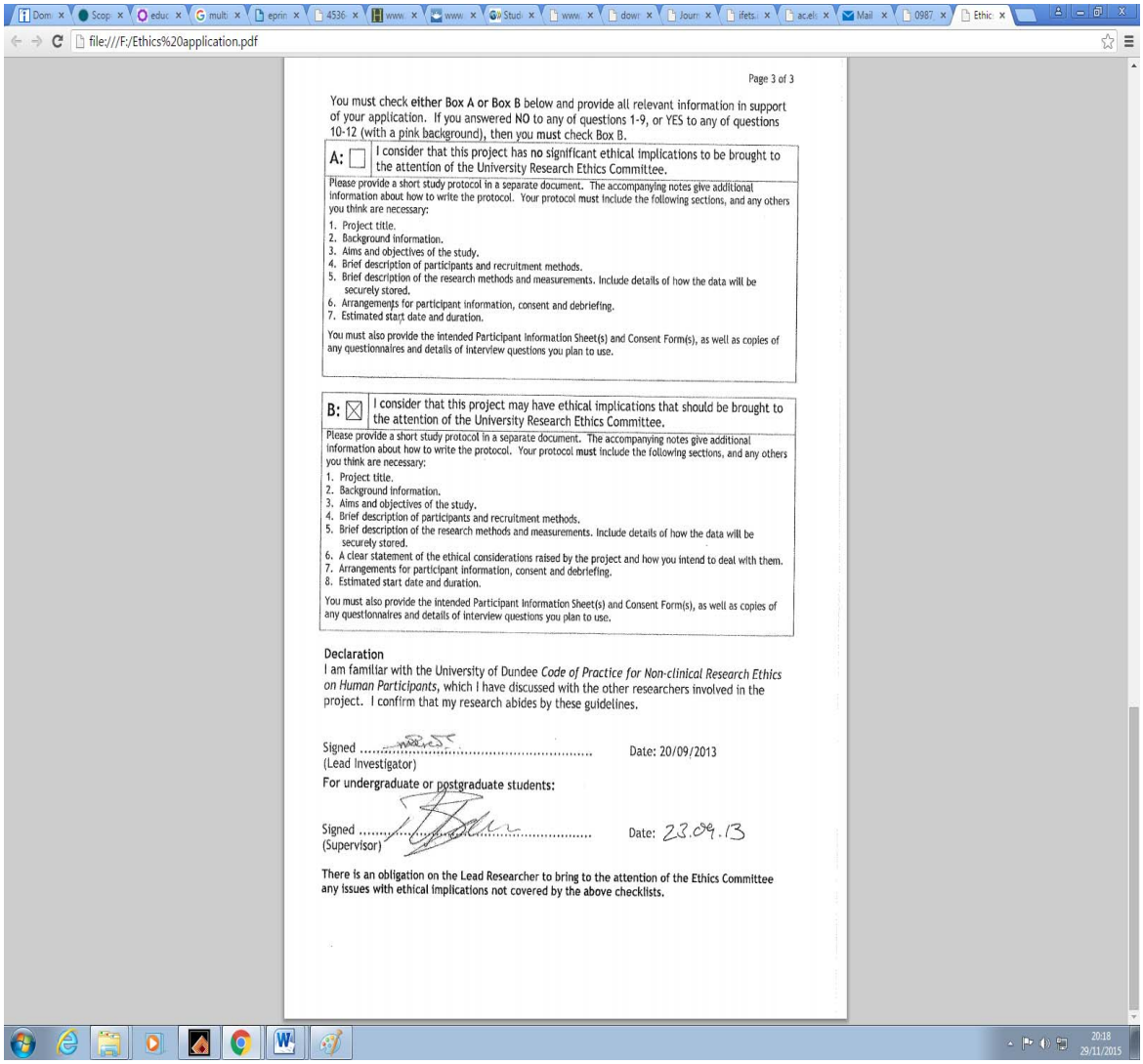
Project start date: 2013	**Project duration:** 2015
Date application submitted: 19-09-2013	**UREC Ref no. (LEAVE BLANK):**



YOU MUST ANSWER ALL QUESTIONS		YES	NO	N/A
1	Will you describe the main procedures in advance to participants so that they are informed about what to expect in your study?	☒	☐	☐
2	Will you tell participants that their participation is voluntary?	☒	☐	☐
3	Will your participants be able to read and understand the participant information sheet?	☒	☐	☐
4	Will you obtain written informed consent for participation?	☒	☐	☐
5	If the research is only observational (i.e. no experimental intervention or direct contact), will you ask participants for their consent to being observed?	☐	☐	☒
6	Will you tell participants that they may withdraw from the research at any time without penalty and for any reason?	☒	☐	☐
7	With questionnaires, will you give participants the option of omitting questions they do not want to answer?	☐	☐	☒
8	Will you tell participants that their data will be treated with full confidentiality and that, if published, it will not be identifiable as theirs?	☒	☐	☐
9	Will you give participants a brief explanation of the purpose of the study at the end of their participation in it, and answer any questions?	☒	☐	☐
10	Will your project involve deliberately misleading participants in any way? If YES, you must provide a justification in the research protocol.	☐	☒	☐
11	Is there any realistic risk of any participants experiencing either physical or psychological distress or discomfort? If YES, give details in the research protocol and state what you will tell them to do if they should experience any problems (e.g. who they can contact for help).	☐	☒	☐
12	Do the participants fall into any of the following special groups? If the answer is YES, indicate which group(s) by checking the appropriate box(es):	☒	☐	☐

☒ Children (under 18 years of age)
☐ Children (under 5 years of age)
☐ People with disability such as learning or communication difficulties.
Please specify disability:
☐ Pregnant women
☐ People studied with respect to contraception or conception
☐ People in custody
☐ People engaged in illegal activities (e.g. drug-taking)
☐ Non-human animals
☐ Patients
☐ More than 5000 participants

NOTE: You may also need to obtain clearance from Disclosure Scotland or an equivalent authority.



file:///F:/Ethics%20application.pdf

You must check **either Box A or Box B** below and provide all relevant information in support of your application. If you answered **NO** to any of questions 1-9, or YES to any of questions 10-12 (with a pink background), then you **must** check Box B.

A: ☐ I consider that this project has **no** significant ethical implications to be brought to the attention of the University Research Ethics Committee.

Please provide a short study protocol in a separate document. The accompanying notes give additional information about how to write the protocol. Your protocol **must** include the following sections, and any others you think are necessary:

1. Project title.
2. Background information.
3. Aims and objectives of the study.
4. Brief description of participants and recruitment methods.
5. Brief description of the research methods and measurements. Include details of how the data will be securely stored.
6. Arrangements for participant information, consent and debriefing.
7. Estimated start date and duration.

You must also provide the intended Participant Information Sheet(s) and Consent Form(s), as well as copies of any questionnaires and details of interview questions you plan to use.

B: ☒ I consider that this project may have ethical implications that should be brought to the attention of the University Research Ethics Committee.

Please provide a short study protocol in a separate document. The accompanying notes give additional information about how to write the protocol. Your protocol **must** include the following sections, and any others you think are necessary:

1. Project title.
2. Background information.
3. Aims and objectives of the study.
4. Brief description of participants and recruitment methods.
5. Brief description of the research methods and measurements. Include details of how the data will be securely stored.
6. A clear statement of the ethical considerations raised by the project and how you intend to deal with them.
7. Arrangements for participant information, consent and debriefing.
8. Estimated start date and duration.

You must also provide the intended Participant Information Sheet(s) and Consent Form(s), as well as copies of any questionnaires and details of interview questions you plan to use.

Declaration

I am familiar with the University of Dundee *Code of Practice for Non-clinical Research Ethics on Human Participants*, which I have discussed with the other researchers involved in the project. I confirm that my research abides by these guidelines.

Signed ..... Date: 20/09/2013
(Lead Investigator)

For undergraduate or postgraduate students:

Signed ..... Date: 23.09.13
(Supervisor)

There is an obligation on the Lead Researcher to bring to the attention of the Ethics Committee any issues with ethical implications not covered by the above checklists.

Appendix B – UREC Ethics approval by Chairman

Re: UREC 13126 - approved

Astrid Schloerscheidt

Fri 11/15/2013 5:07 PM

To:Daisy Nwaozuzu <D.Nwaozuzu@dundee.ac.uk>;

Cc:Astrid Schloerscheidt <A.Schloerscheidt@dundee.ac.uk>; Elizabeth Evans <e.evans@dundee.ac.uk>;

Dear Daisy,

Many thanks for the documents and for bearing with me. Your study is now approved.

Best wishes,

Astrid

From: Daisy Nwaozuzu <D.Nwaozuzu@dundee.ac.uk>
Date: Wednesday, 13 November 2013 14:20
To: Astrid Schloerscheidt <a.schloerscheidt@dundee.ac.uk>
Subject: RE: UREC 13126

Good day,

Hope your day is progressing well as expected.
Pls, find attached the updated Participant information sheet and the Study/ research project details.

Thanks and have a lovely day

Daisy

Appendix C: Variable Table

	Teacher interview	Teacher questionnaire	Pupil Questionnaire	Pupil Interview	Employer questionnaire
Variables Teacher perception on impact of ICT on generic skills acquisition	•	•			
Teacher ICT Competency		•			
Teacher perception on actual ICT use in classrooms	•	•			
Teacher perception on alignment of curriculum with generic skills development	•				
Teacher computer use outside the classroom	•	•			
Teacher openness to change	•	•			
Pupils perception on impact of ICT on generic skills acquisition			•	•	
Pupils perception on acquired generic skills for transition to further education			•	•	
Pupil perception on impact of ICT on school transition to work and living			•	•	
Pupil perception on actual ICT use in classrooms			•	•	
Pupil computer use outside the classroom			•	•	
Pupil openness to change			•	•	

Employer expectations of potential employee generic skills- base				•	•

Appendix D: Pupil's Consent form.

Study Title
The role of ICT in developing transferable generic skills among secondary school pupils in Scotland

Instruction: Please put a tick on all that applies to you;

1.	I confirm that I have read and understood the information sheet for the study.	☐
2.	I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason and without any effect on my education	☐
3.	I am happy to complete the questionnaire.	☐
4	I will like to participate in the interview stage (S5 and S6 only)	☐

Signature of Pupil	
Name of Pupil:	
Name of School	
Class	
Email Address	

Appendix E: Pupil Information sheet.

PARTICIPANT INFORMATION SHEET FOR PUPILS

The role of Information and communication technology in supporting secondary school pupils in Scotland in developing transferable generic skills

INVITATION TO TAKE PART IN A RESEARCH STUDY
You are being asked to take part in a research study which is to try and find out more about the influence of the role of Information and communication technology (ICT) towards developing transferable generic skills which will be used in further education, employment and for living. The study will seek to find out from you, your feelings and perceptions of your use of ICT in schools and the skills you have acquired from it. It will also want to find out if these skills acquired from the use of ICT in schools have prepared you for going into the college or work or for living. The lead investigator of this project is Daisy Nwaozuzu, a PhD student in the School of Education, Social Work and Community Education at Dundee University. Dr Ian Barron and Dr Liz Lakin are supervising the project. By clicking on the survey link below, you are consenting to have read and understood this information sheet. It is entirely voluntary to participate in the study.

PURPOSE OF THE RESEARCH STUDY
My study is aimed at investigating the role of ICT towards developing transferable generic skills which will be employed in further education, employment and for living. ICT use in education has been a top priority in EU since 2000 and the Scottish government has aligned its educational policy through the launching of Curriculum for Excellence and through investment in ICT in schools, aimed at preparing students for the knowledge society. This study seeks to explore the perceptions of pupils towards the use of ICT. These perceptions could either be positive or negative or have a direct influence on the use of ICT and the expected generic skills associated with its use

TIME COMMITMENT
You are required to complete a questionnaire which will take not more than 15 minutes

TERMINATION OF PARTICIPATION
You may decide to stop being a part of the research study at any time without explanation or negative consequences and without effect on your studies.

RISKS
There are no known risks for you in this study.

COST, REIMBURSEMENT AND COMPENSATION
Your participation in this study is voluntary.

CONFIDENTIALITY/ANONYMITY
All data records will be held on a password protected network with a backup held in a secure office. All data will not be used for any other purpose than to inform this specific study. Participant anonymity is guaranteed and the data collected will not contain any

personal data. All data will be coded in order to protect participants' identity. The results of the study will be reported in a thesis that is expected to be completed in 2015. Once completed, the data will be destroyed and the report becomes available for reference. You will not be identified in the report and any other publications.

FOR FURTHER INFORMATION ABOUT THIS RESEARCH STUDY

Please contact:

Researcher: Daisy Nwaozuzu, University of Dundee,
Phone : (+44) 01382 381400; e-mail: d.nwaozuzu@dundee.ac.uk

The Survey Link for **Pupils**-http://www.survey.dundee.ac.uk/pupils-ict/

Appendix F: Pupil Questionnaire.

PUPIL'S QUESTIONNAIRE

Section 1: Personal details and position in the school

1. **Age range** (years)
13-15 □
16-18 □

2. **Class:**
3. School
4. Gender

Section 2: Pupils' Use of ICT
5. Do you have good access to a computer at home? Yes□ No□

6. Do you have good access to a computer at school? Yes□ No□

7. How would you describe your computer skills? ***Tick one***
□Non-existent □Beginner level □Intermediate level

□Advanced level □Expert Level

8. What type of application have you learned /used in school? ***Tick all that apply***
□PowerPoint □Word processing
□Spreadsheets
□Graphics/drawing packages □Email □Internet access
□Specialist subject program □Glow
□Social Media □Other……
□None of them

9.

For these questions use the guidelines**: Regularly** = 3 or more times a week **Quite often** = once or twice a week. **Sometimes** = once in most weeks. **Not very often** = about once a month

	1	**2**	**3**	**4**	**5**
At school how often do you use	**Regularly**	**Quite often**	**Sometimes**	**Not very often**	**Never/ hardly ever**

ICT					
`Internet					
Email					
Word processing					
Spreadsheet /Excel					
Power point presentation					
Graphics and drawing packages					

10. How did you gain skills in using computers? ***Tick all applicable***

□Taught by family member □ Taught by a friend

□Taught by the teacher at school □By playing games at home

□By trial and error □Other……

11. What do you use ICT for?

□To keep up with technology.
□To play games.
□To search for information on the internet.
□To chat with friends in other schools
□To exchange email with friends in other schools
□To do my homework from school
□To acquire generic skills for my future ambition
□ Other ……

Section 3: Pupils perceptions of ICT

Your general views towards ICT

12. We want to get your general views about using ICT in school and its importance.

For these questions use the guidelines**:** = 1-5 where 1 is **strongly agree** and 5 is **Strongly disagree**.

	1	2	3	4	5
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
ICT has an important part to play in teaching and learning generally.					
ICT makes work easier					
ICT makes learning enjoyable, more fun, and keeps boredom at bay					

I learn more with ICT at home than I do at school					
The time spent on ICT at school is too short to develop any extra skills					
ICT use at school gives me some extra skills that I can use in future					
ICT use at school is adequately preparing me for further education					
ICT helps me to communicate and interact effectively with other pupils in other schools					
The internet helps me to gain more knowledge which is useful for my future					
ICT use at school teaches neat presentation skills for pupils					
The ICT use in school is developing adequate skills for pupils to use outside school					
ICT use in school is developing the skills needed for work					

Thanks for filling this questionnaire

I am happy to participate in an individual interview Yes ☐ No ☐

I agree to audio recording of the interview Yes ☐ No ☐

Preferred date and time: …….

Email address ……

Appendix G. Teachers Consent form

TEACHERS/ CONSENT FORM

Study Title
The role of ICT in developing transferable generic skills among secondary school pupils in Scotland

Instruction: Please put a tick on all that applies to you;

1. I am happy to participate in an individual interview	Yes ☐	No ☐
2 I am happy to participate in questionnaire and interview	Yes ☐	No ☐
3. I am happy for the interview to be digitally recorded.	Yes ☐	No ☐
4. I understand that my participation is voluntary and that I am free to withdraw at any time, without giving any reason.	Yes ☐	No ☐

Signature	
Name of School	
ID Code	
Date	
Email	
Name and signature of person obtaining consent	

Appendix H: Teacher information sheet.

PARTICIPANT INFORMATION SHEET FOR TEACHERS

The role of Information and Communication technology (ICT) in supporting secondary school pupils in Scotland in developing transferable generic skills

INVITATION TO TAKE PART IN A RESEARCH STUDY
You are being asked to take part in a research study which is to try and find out more about the influence of the role of ICT towards developing transferable generic skills which will be employed in further education, employment and for living. The study will address the perceptions of teachers and lecturers on the use and integration of ICT in the curriculum as proposed by the Curriculum for Excellence. It will also seek their perceptions of ICT towards preparing pupils and students for life after completing their secondary school.

The lead investigator of this project is Daisy Nwaozuzu, a PhD student in the School of Education, Social Work and Community Education at Dundee University. Dr Ian Barron and Dr Liz Lakin are supervising the project. By completing and returning the questionnaire, you will be indicating that you have read and understood this information sheet, and agree to the study. The short questionnaire will take no more than 20 minutes. In addition volunteers will be sought for an individual focus interview. Interested participant for an individual focus interview will give an indication by ticking the box at the end of the questionnaire and thereafter indicate their preferred choice of date for the interview. The interview will last for 20 mins and it will be audio recorded. It is entirely voluntary.

PURPOSE OF THE RESEARCH STUDY
This study seeks to explore the perceptions of teachers and pupils towards the use of ICT. These perceptions could both be positive or negative and have a direct influence on the use of ICT and the expected generic skills associated with the use of ICT. It aims to explore the preparedness of the pupils towards the knowledge society
ICT use in education has been a top priority in EU since 2000 and the Scottish government has aligned its educational policy through the launching of Curriculum for Excellence and through investment in ICT in schools, aimed at preparing students for the knowledge society.

TIME COMMITMENT
You are required to complete a questionnaire which will take not more than 20 minutes

TERMINATION OF PARTICIPATION
You may decide to stop being a part of the research study at any time without explanation and any negative consequence.

RISKS
There are no known risks for you in this study.

COST, REIMBURSEMENT AND COMPENSATION
Your participation in this study is voluntary.

CONFIDENTIALITY/ANONYMITY
All data records will be held on a password protected network with a backup held in a secure office. All data will not be used for any other purpose than to inform this specific study. The audio recordings from the individual interview will be stored in a secure password protected computer for a limited period – till the completion and production of the thesis. During this period access will be given to the supervisors named above, and an external examiner for compliance. The audio recordings will also be transcribed by the researcher. Participant anonymity is guaranteed and the data collected will not contain any personal data. All data will be coded in order to protect participants' identity. The results of the study will be reported in a thesis that is expected to be completed in 2015. Once completed, the data will be destroyed and the report becomes available for reference. You will not be identified in the report and any other publications.

FOR FURTHER INFORMATION ABOUT THIS RESEARCH STUDY
Please contact:
Researcher: Daisy Nwaozuzu, University of Dundee,
Phone : (+44) 01382 381400; Mobile -07443549931, and e-mail:
d.nwaozuzu@dundee.ac.uk

The Survey online Link for **Teachers**- http://www.survey.dundee.ac.uk/teacher-ict-questionnaire/

Appendix I: Teacher Questionnaire

TEACHER QUESTIONNAIRE **CODE:** ☐

By completing and returning the questionnaire, you will be indicating that you have read and understood the participant information sheet, and agree to participate in this study.

Section 1: Personal details and role in the school

1. **Age range** (years):

20-29 ☐ **Gender:** ☐

30-39 ☐ **Ethnicity:** ☐

40-49 ☐

50-59 ☐

60+ ☐

2. **Number of years in teaching** (at start of term):

1 ☐

2-4 ☐

5-9 ☐

10+ ☐

3. **What is your main teaching subject?** .....

4. **What is your qualification?** .....……

Section 2: Teachers' Use of ICT

5. In your view, why should teachers, if at all, use ICT in their teaching?

……
…
……
…

6. What type of application do you use for teaching? ***Tick all that apply***

□PowerPoint □Word processing □Spreadsheets

□Graphics/drawing packages □Email □Internet access

□Own your own website □Specialist subject program □Glow

□Social media □Other……

□None of them

7. In this question we want to find out about your use of ICT for teaching, for lesson preparation, and other duties relating to teaching

	Regularly	**Quite often**	**Sometimes**	**Not very often**	**Never/ hardly ever**
How often do you use ICT in your lesson					
How often do you use internet in retrieving academic information while in school					
How often do you use ICT for administration and record keeping purposes					
How often do your students use ICT in lessons that you are teaching					
How often do use ICT in your teaching					
How often do you use email for school and professional purposes					

8. Please list the 3 main ways you use ICT in relation to your role as a teacher

……

……

……

9. Do you have access to a computer at home? Yes□ No□

10. Do you have access to a computer at school? Yes□ No□

11**. How would you describe your computer skills?** ***Tick one***

□Non-existent □Beginner level □Intermediate level

□Advanced level □Expert

12**. How did you gain skills in using computers?** ***Tick all applicable***

□Attended in-school training course for teacher's □Attended computer training courses

□Learnt as a generic course as part of my degree □Assisted by a colleague

□Assisted by family member, or friend

□By trial and error
□Other……

13**. Why are you using ICT in your teaching?**

□To keep abreast of advancement in technology
□Because the Curriculum for Excellence made it compulsory.
□For a change of class routine to maintain interest
□It is readily available in the classroom
□It is a method for improving and developing teaching
□It is used as a symbol of modernisation
□It has impact on generic skills
□It is an effective method to convey information
□It is a professional way of teaching
□ Other ……

Section 3: Your general views and perceptions towards ICT

14. We want to get your general views about ICT use in education as well as in your own subject.

	1	2	3	4	5
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
ICT has an important part to play in teaching and learning generally.					
ICT makes work easier					
ICT makes teaching enjoyable, changes routine, and keeps boredom at bay					
There is too much emphasis on the use of ICT in schools					

There is a good justification for the investment in ICT in schools in terms of skills acquisition					
ICT has a positive influence on students interaction and attention					
ICT use helps in information reinforcement					
ICT use improves teachers and students research skills					
ICT offers neat presentation skills for both the teacher and the student					
The ICT use in school is developing adequate skills for pupils to use outside school					
ICT use in school is developing the skills needed for work					
There are transferable skills from using ICT in schools that will used in further education					
ICT use offers continuous student-teacher communication.					
ICT offer a flexible relationship between teachers and pupils					

I am happy to participate in an individual interview Yes ☐ No ☐

I agree to audio recording of the interview Yes ☐ No ☐

Preferred date and time: …….

Email address ……

Appendix J: EMPLOYER INFORMATION SHEET

PARTICIPANT INFORMATION SHEET

The role of ICT in supporting secondary school pupils in Scotland in developing transferable generic skills

INVITATION TO TAKE PART IN A RESEARCH STUDY

You are being asked to take part in a research study which is to try and find out more about the influence of the role of ICT towards developing generic skills which needed in employment and for living. The study will address the perceptions of employers on the use and integration of ICT in the school curriculum as proposed by the Curriculum for Excellence. It will also seek their perceptions of ICT towards preparing pupils for life after completing their secondary school education. The lead investigator of this project is Daisy Nwaozuzu, a PhD student in the School of Education, Social Work and Community Education at Dundee University. Dr Ian Barron and Dr Liz Lakin are supervising the project. By completing and returning the questionnaire, you will be indicating that you have read and understood this information sheet, and agree to the study. The short questionnaire will take no more than 10 minutes.

PURPOSE OF THE RESEARCH STUDY

The study is aimed at examining the role played by the labour market conditions and the drivers of youth unemployment. ICT use in education has been a top priority in EU since 2000 and the Scottish government has aligned its educational policy through the launching of Curriculum for Excellence and through investment in ICT in schools, aimed at preparing students for the knowledge society and with the right employability skills. This study seeks to explore the perceptions of employers that engage young school leavers on the role played by ICT in school towards developing work skills among young people. These perceptions could either be positive or negative or have a direct influence on the use of ICT and expected generic skills associated with the use of ICT.

TIME COMMITMENT

The research has commenced.

TERMINATION OF PARTICIPATION

You may decide to stop being a part of the research study at any time without explanation.

RISKS

There are no known risks for you in this study.

COST, REIMBURSEMENT AND COMPENSATION

Your participation in this study is voluntary.

CONFIDENTIALITY/ANONYMITY

All data records will be held on a password protected network with a backup held in a secure office. All data will not be used for any other purpose than to inform this specific study. Participant anonymity is guaranteed and the data we collect does not contain any personal data. All data will be coded in order to protect participants' identity. The results of the study will be reported in a thesis that is expected to be completed in 2015. Once completed, the report is available for reference. You will not be identified in the report and any other publications.

FOR FURTHER INFORMATION ABOUT THIS RESEARCH STUDY

Please contact:

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Appendix K: Employer questionnaire

EMPLOYERS QUESTIONNAIRE **CODE:** ☐

By completing and returning the questionnaire, you will be indicating that you have read and understood this information sheet, and agree to the study.

Section 1: Personal details and role in your organisation

1Gender: M ☐ F ☐

2. Ethnicity: …….....

3. **Age range** (years):

16-25 ☐

26-35 ☐

36-45 ☐

46-55 ☐

56-65 ☐

4. **Number of years of service with your organisation**

1 ☐

2-4 ☐

5-9 ☐

10+ ☐

Section 2: Access and role in your organisation

5. **What does your organisation do?**

……..
…….
…….
…….

6. **What is your main role or task in your organisation?**

.....
……
…….

7. What is your highest academic qualification?

……

7. What are your technical qualification?

……

8. Do you have access to ICT at work? Yes□ No□

9. Do you have access to ICT at home? Yes□ No□

Section 3: Your perceptions and ICT Use

10. In your view, why should you use ICT in your organisation?

……

……

……

11. What type of application do you for your role in your organisation? *Tick all that apply*

□PowerPoint □Word processing □Spreadsheets

□Graphics/drawing packages □Email □Internet access

□Own your own website □Specialist program □Data base / Access

□Social media □Other……

□None of them

12. Please list the 3 main ways you use ICT in relation to your role

……

……

…….

13. How would you describe your computer skills? *Tick one*

□Non-existent □Beginner level □Intermediate level

□Advanced level □Expert

14. How did you gain skills in using computers? *Tick all applicable*

□Learnt at school □ Learnt on the Job □Attended computer training courses

□Learnt as a generic course /part of my degree □Taught by a colleague

□Taught by family member, or friend □Learnt by trial and error

□Other……

15. Why are you using ICT in your organisation?

□To process information very quickly and accurately

□Because it makes the job easier.

□My job task cannot be done without ICT

□It is a method for improving skills for life

□It has impact on generic skills improvement

□It is an effective method to convey information

16. We want to get your general views about using ICT at work and its importance.

For these questions use the guidelines**:** = 1-5 where 1 is **strongly agree** and 5 is **Strongly disagree**.

	1	2	3	4	5
	Strongly Agree	Agree	Neutral	Disagree	Strongly Disagree
There is a good justification for the investment in ICT in schools in terms of young school leavers acquired skills					
The ICT I used during my school days prepared me for work					
The acquired ICT skills at school are very useful at work					
Acquired ICT skills from school are more generic and transferable					
ICT skills improves generic skills for the society					
There is a positive relationship between the ICT use in schools and work					
Work skills are better of subject dependent at school and core to the curriculum					
ICT learnt at a young school age are more sustainable than at later age					
ICT use improves employee relationship					
Pupils coming from school to work come readily prepared with the right skills					
I will employ a young school leaver because of his work skills					

Thanks for filling this Questionnaire.

Appendix L: Systematic Literature Search Matrices.

SN	**Author and title**	**methodology**	**theme**	**Sample/ Data size**	**Variables/ instruments**	**Results/ outcomes Controversies, disagreements with other authors**	**Limitations/ Implications**
1	**Mundy, M.-A., and Kupczynski, L., 2013** A qualitative study of technology integration into culture and sustainability in schools	Qualitative Research based study. On site interns were used to teach teachers and encourage ICT integration in class.	The use of ICT to support learning and instruction in a meaningful way.	technology director; high school and elementary principals; high school English and science teachers; middle school librarian, Math and alternative education teachers; and elementary music and special education teachers	interview	Teach up program was designed as a means of achieving the goals of student achievement through improved use and integration of technology,	Teach up program was only used in two school district.
2	**Anderson, R. E. (2008)** Implications of the information and knowledge	Discursive papers	The link between knowledge and ICT literacy assessment	NA	Documentary analysis	A conceptual framework on the role of knowledge in educations attempts to	Desktop research

	society for education.					apply technology to learning	
3	**Christopher Ward, 2009** Musical exploration using ICT in the middle and secondary school classroom	Research based study - Action research	Exploration of musical creativity through ICT	189 pupils from One secondary school and one middle school in Windsor UK	Questionnaire, interview, teacher lesson logs, audio recordings, digital files,	Brunnel's Constructivist philosophy, of going beyond instruction was enabled. Action research was continuously used to improve learning environment	One subject-music, which varies with other subjects with less ICT consumption
4	**Humes,W. (2013)** Curriculum for excellence and interdisciplinary learning	Exploratory workshop	Exploration of interdisciplinary learning by young Scotts	Young academy of Scotland, CfE working group	Questionnaire and Documentary analysis	Promotion of Interdisciplinary learning through the integration of knowledge skills and understanding across different supporting groups	IDL may inhibit as some learners can't cope with exploratory learning situations having been used to sequential learning or structured learning.
5	**Lord, P., and Jones, M. (2006)**	Descriptive study -.	Exploration of young people's views on curriculum and	Discussant paper based on review of 300 papers	Documentary analysis of 300 papers	Review of the research on pupils' experiences of	Desktop research

	Pupils' Experiences and Perspectives of the National Curriculum and Assessment		qualification and how best to incorporate these views into the curriculum. Review of curriculum between 1989 - 2005			and perspectives on the curriculum(including the whole curriculum, individual subjects, assessment and work-related learning) published in the UK between 1989 and 2005	
6	**Lingard, B. (2010)** Policy borrowing, policy learning: Testing times in Australian schooling.	Descriptive study	The paper investigates a contextualized policy analysis on Australian national schooling , especially the national testing on Literacy and Numeracy	Formal testing on- National literacy and numeracy testing at years 3, 5, 7, and 9 In all schools in Australia	Documentary Analysis	The emergence of a national system of schooling with national curriculum as part of the reconstitution of the nation due to globalization and related economization of education policy	The outcome of the analysis suggests a hybrid of the highly criticized neo – liberalism and social democracy.

7	**Priestly, M and Minty, S. (2012)** Developing Curriculum for Excellence: summary of findings from research undertaken in a Scottish local authority	Mixed method approach-online survey and semi structured interview	teachers' views of the new Scottish curriculum, and the nature and extent of implementation in its first year	21 participant involving stakeholder-teachers, head teachers and rep from local government	Online questionnaire and interview	CfE document lacks clarity in the process to guide school based curriculum.	Identified effective practices of curriculum implementation and teachers' professional learning in the context of Curriculum for Excellence (CfE. Implementation in many schools will not reflect the expected transformational change envisaged by its designers.
8	**Martinovic Drogana, (2012)** Situating ICT in teacher educational program: overcoming Challenges, fulfilling expectations	Research based study (sequential mixed method with Case study)	Pre-service teachers expectations and attitudes towards ICT integration Pre-service teachers perceptions if ICT in teacher education	64 students for online and 17 for interview	Online survey and focus group meetings	The pre teachers seems to be more knowledgeable in ICT. They are actively seeking for opportunities to try different kinds of ICT for more knowledge	There are high expectations of ICT capabilities with future teachers

9	**Bocconi Stefania, 2013** Measuring ICT use and learning outcomes: evidence from recent economic studies	Research based study. Quantitative study	Relationship between students computer use and their achievement in reading, mathematics and sciences –PISA result	23 countries	Online survey	Gaming activities increases the students intensity of computer use while school curricula activities decreases their computer use	
10	**Bocconi Stefania, Kampylis Panagiotis, and Punie Yves, (2013)** Framing ICT-enabled innovation for learning: the case of one to one learning initiatives in Europe	Research based study – case study	1: 1 learning initiatives in Europe aimed at transformative changes in education	19 European countries, involving 620,000 schools and 16,800,000 students	Online survey	Contribution to policy interventions at micro, meso and macro level. Impacts on innovation in teaching and learning.	There is a gap on deeper learning practices of student
11	**Hillis P. and Munro, B., (2005).** ICT in History Education- Scotland and Europe	Discursive papers based on- case study research	The growing importance of ICT in the teaching of history	N/A	Documenta ry analysis	The potentials of ICT is yet to be realized in Scotland and Europe despite the investment and	

						cross Europe support	
12	**Judge Miriam, 2013** Mapping out the ICT integration terrain in school	Mixed methods	Looked at an Innovative way of removing the barrier of ICT integration, especially the technical issues associated with the adoption	119 teachers from 8 school	questionnaire and interview	Created an ICT infrastructure, managed centrally in the school. Sees school culture as a determining factor to innovation support. Worked at ICT mediation	
13	**Hannele, Niemi, (2013).** Towards ICT in everyday life Finnish Schools: seeking conditions for good services	Discursive paper	The study identifies and analyses schools as systems and to identify the school communities that can promote ICT for everyday use.	Observation in 20 Finnish schools	Observation and interviews	The study identifies open school culture which encourages teachers' autonomy to be necessary for promoting new technology in school. Other strategy includes, open curriculum, participatory method of	.

						teaching and learning	
14	**Finegold, D., and Notabartolo, A. S. (2010)**21st century competencies and their impact: An interdisciplinary literature review.	Discursive paper	The Lack of evidence on the relationship between competencies, and the individual or organizational outcomes has suggested a need to explore and develop the most effective mechanisms for generic skills development	NA	Literature Review	The review shows that there is an agreement among policy makers and researchers in OECD countries on key competencies required by workers in the 21st C	There are few studies assessing the effect of the competencies on outcomes due to lack of measures of these competencies
16	**Fenwick, A Minty, S and Priestly M, 2013** Swimming against the Tide: a case study of an integrated social studies department	Research based study – comparative Case study	A challenge for subject specialist to demonstrate inter connectivity of their subject with key life skills as CfE entails	1 social studies dept. was compared against 3 schools social studies dept. in one council. 4 principal teachers of social studies dept. were interviewed.	interview	A developed and sustained circular initiative which is against the current trend in Scottish	Exclusion of pupils' perspective hence only teacher's perspective was considered in the result.

17	**OFSTED, 2011** ICT in schools 2008 – 2011	Discursive paper-Report	Inspection of ICT in 167 primary, secondary, and special education between 2008 - 2011 in England	Report on quality of the provision, its impact on achievement, assessment, curriculum and qualification in key stage 4, staff professional development, availability	Observation and report log	The use of ICT is considered both as a specialist subject and across the wider curriculum	The teaching of ICT was less positive in secondary schools
18	**Tondeur, J., Van Braak, J., and Valcke, M. (2007)** Curricula and the use of ICT in education: Two worlds apart	Survey research	The paper investigates teachers' prospective and actual use of ICT, considering the fact that there was the absence of a formal and established ICT curriculum leads in Finland. Unlike countries like UK and Canada that has ICT as part of the school curriculum	570 respondents from 53 primary school	questionnaire	Teacher's focus more on technical skills rather than integrated use of ICT in teaching and learning. The paper confirms the gap between the proposed and the implemented curriculum for ICT.	

19	**Martinovic Drogana, (2012)** 22Situating ICT in teacher education program: Overcoming challenges, fulfilling expectations	Exploratory research with sequential mixed method with Case study	1. Willingness and preparedness to teach with ICT of pre service teachers. 2.Comparison of ICT availability and use I n Teacher Education Program	87 pre service teachers were used in stage 1 (questionnaire) and 12 in stage 2 (focus interview	Online survey and focus group	Recommended emphasis on knowledge of technological applications in a subject area for both pre service and in service teachers. Knowledge deepening is related to skilled and constructive	Some challenges in TEP internationally – limited ICT access in TEP and in schools. Identifies inadequate access to ICT as responsible for non-integration by teachers
20	**Crawford, R. (2009)** Secondary school music education: A case study in adapting to ICT resource limitations	Mixed method with a single Case study. Single subject (music) was tested for creativity	Teacher and student perception of the use of ICT in school especially in class music	Music class in one secondary school	Survey and interview	Creativity skills aided by ICT use, in spite of the limited ICT resources	The Paucity of resources is still a challenge and concern
21	**González-Sanmamed, Mercedes, 2010** The role of information and communication technologies in	Multiple case study, using four different types of schools	ICT as a resource and a strategy for innovation factor	All 40 teachers in the 4 selected schools	Questionnaire and Interview	There is a widespread view that ICT in teaching favors several teaching and Learning processes.	Teachers beliefs need to be incorporated when designing teaching process in

	improving teaching and learning processes in primary and secondary schools					Recommended modernization of technological tools, change of the teaching models- teacher's role, classroom organization, the teaching and learning processes, and the interaction mechanisms	other to understand innovative uses of ICT for higher ed. purposes
22	**Wastiau, Patricia Roger Blamire, Caroline Kearney, Valerie Quittre, Eva Van de Gaer and Christian Monseur.2013** The Use of ICT in Education: a survey of schools in Europe	survey	The survey investigated Frequency of use, Teachers/ pupils confidence, Teachers / pupils competence, Teachers opinion on ICT use in teaching and school support	190,000 comprising of teachers, pupils and head teachers randomly selected	questionnaire	Found out that despite huge funding towards ICT in schools in Europe, lack of reliable data exists.	Findings are generalized whereas individual country's circumstances are not same. Does a high percentage of digitally supportive school result in high percentage of confident and positive teacher and pupil?

23	**Wilson, A. and McKinney, S. 2012** Glow or glimmer? A case study of ICT innovation in a Scottish	Action research with single case study approach	Virtual learning Environment (VLE). Innovation in ICT as a challenge to teachers Organizational and professional development.	A single case study involving interview with 4 principal class teachers, 2 class teachers/ technologist. 7 pupils, 2 policy member within the local council	Interviews and focus groups, analysis of login details and pattern usage of VLE tools.	Effective staff and ICT development are inseparable from the wider ecologies in which schools are positioned.	Most teachers do not seem to be interested in the VLE
24	**Condie, R and Simpson, M. (2004)** The impact of ICT initiatives in Scottish schools: cultural issues	Survey Methodology	Assessing the extent to which ICT initiatives had impacted on classroom practice	125 primary teachers and 450 secondary school teachers	questionnaire	Attitudes and aspirations were tied to the cultural issues of the school.	Schools needs to Personalize how best to achieve the designed result and changes expected with ICT
25	**Davidson, J.** Perspectives on digital technology in a remote rural school: a qualitative study	Qualitative and ethnographic methodology	perceptions of the school's staff, students, parents and community partners on the effect of the digital technology project	16 face to face interview and 17 telephone interviews of students	focus group interview	Improvement of ICT skills of the students	
26	**Lei. J, and Zhao . Y** , 2008	Longitudinal study	How the quantity and quality of	Student and teachers from 1	Questionnaire and interview	Positive benefits of ICT is not	Technogy uses that have positive

	Technology uses and student achievement: A longitudinal study		technology use affects learning outcomes.	middle school in Ohio, USA		determined by the quantity of ICT a school can afford or the length of time spent	impact are not often used byt the
27	**Stockford, A., Jefferies, P., and Egan, R**. What are the perceptions of stakeholders in both the UK and Germany in relation to the teaching and learning of ICT and its relevance in the work place?	Comparative Case study approach using 14-19yr old in selected schools in Bedfordshire, UK and Germany	Investigation into the level of connectedness between school curricula and local businesses in the UK and Germany	110 pupils and 8 teachers in Bedfordshire UK and 84 students and 5 teachers from Germany	capacity study and questionnaire	the ICT curriculum was focused quite clearly on academic knowledge of ICT rather than practical skill that employers are seeking	
28	**SITES 2006**	International comparative Survey. With 22 educational system (countries) participating	Looked at the characteristics of teachers pedagogical practices (considered to be conducive for the 21st century skills) in general and when ICT is used. It also looked at their relationship	2 variation of population-mathematics teachers and science teachers teaching grade 8	Questionnaires to school principals, technology coordinator	The traditionally important orientation was the most dominant in middle school maths teachers and science teachers classroom practices	

29	**Halsey, K., Murfield, J., Harland, J. L., and Lord, P. (2006)** The Voice of Young People: An Engine for Improvement	Multiple case study research methodology	Teachers perception on how ICT is contributing to the teaching and learning	40 teachers in 4 school	Interviews and questionnaire	Theres a relationship between teacher's perception and equipment, use and innovation. ICT innovation use has a positive link to improved learning outcome. The kind of ICT is a key factor for innovation, teaching and improvement of learning process	
30	**Wong, E. M. and Lt, S., (2008)** Framing ICT implementation in a context of educational change: a multilevel analysis.	Survey research with Multi level model	The role of ICT in effecting changes in students learning. Teachers perception on ICT implementation in schools and	963 teachers from 122 schools comprising of principals and teachers	Large scale questionnaire	The teacher's perception is positive that ICT will bring positive changes in student learning if the context were established	Result is consistent with other research by Balanskat et al 2006 and Wong, 2006 thereby reechoing the contemporary position of

			its effect on learning			collegially in school. -The socio cultural setting of a school was more responsible for the perceived changes in student learning rather than the structural characteristics.	ICT as an enabler to the delivery of instruction
31	**Hennessey S and Deaney, R. (2007)** Exploring teachers mediation of subject learning with ICT: a multimedia approach	In depth case study with 4 UK secondary teachers of English, mathematics, science and history. Study carried out in 4 phases	Subject teaching practices incorporating the use of projection technology (IWB). Multimedia learning outcome	4 teachers and pupils of age 11-16 of a UK school	Observation, video recording, and semi structured interview with pupils	Development of a collaborative theory building process	IWB does not necessarily encourage students interactivity, even though it has got interactivity built into its software. 1.Set up times 2.No enough compelling evidence of improved learning to inspire teachers that it can be used in

							various classroom setting 3.Perceived implications transformative use might have on classroom organization, management and control
32	**Pivec, p.** Game-based learning or game-based teaching (2009)	Digital span forward test of working memory ability	Game based learning. Is it the game or the environment that impacts knowledge to its user	238 participants		Good motivational source, that can assist in the attainment of the competencies	
33	**Conole, G., Laat, M., Dillon Teresa, Darby J. (2008).** Disruptive technologies', 'pedagogical innovation': What's new? Findings from an in-depth study of students' use	Case study across four subject disciplines	Students use and perceptions of technologies. E learning	4 UK HE academy subject centers- Medicine, Dentistry and Vet medicine, economics, information and computer sciences and languages, linguistics and area studies.	Online survey, audio log, and interview	Students in a technologicall y rich environment that supports learning prefer to be selective with the appropriate technology that meets their learning needs.	The finding raises questions on the implications of the way in which educational institutions design and support learning activities.

	and perception of technology						
34	**Clayton kaylene, 2012** Now I know what ICT can do for me	Qualitative study	Promotion of ICT study and work opportunity in girls only middle school to improve the gender bias on ICT	3 middle school- girls only	interview	Investigated factors influencing girls career choices and realized that gender stereotype prevailed in ICT, there by turning girls away from ICT as an occupation	
35	**Hammond Micheal, 2014** Introducing ICT in schools in England: Rationale and consequences	Documentary analysis	Examined policy and practice regarding the use of ICT in England and suggested that the claims made for the implementation of ICT into school is not justified		Policy documents	Recommended a more adaptive stance for ICT due to its multidimensional nature. Teachers need sustained critical support to develop their use of ICT	Disagrees with the claim made on ICT as it does not stand to critical scrutiny
36	**Martinovic, Dragana Zuochen, Zhang, 2012**	Case study of pre service teachers on a Teacher	Teachers perception of availability and use of ICT in	Online survey, and focus group meetings	Questionnaire and interview	-teachers have misconceptions of the educational	Teachers are still uncomfortable to use ICT,

	Situating ICT in the teacher education program: Overcoming challenges, fulfilling expectation	education program	teacher program and placement school			use of some of the ICTs. -there is no enough modelling of ICT pedagogy in schools	regardless of their skill level. -there is still limited access to ICT in schools
37	**Yang Hao, 2012** ICT in English schools: Transforming education	Qualitative study	Limited evidence in transforming teaching and learning in English schools through ICT	8 PGCE tutors from one university	interview	Transformative use goes beyond pedagogical use and as such very crucial to understanding the transformative role of ICT. Sustained educational transformation using ICT involves more pedagogical awareness	There's a possibility for the lack of transformative use of ICT to result in lack of coherent educational transformations of ICT in English schools
38	**Blanche W. O'Bannona, Kevin Thomas 2014.** Teacher perceptions of using mobile	Quantitative study- survey	Study focused on age as it relates to the relationship between the type of phone and integration for	1095 teachers	questionnaire	Older teachers have less access to smart phones and as such less likely to	The age of the teachers matters. Teachers over 50yrs of age were less

	phones in the classroom: Age matters!		school related work			integrate and be supportive. -older teachers lack the skill necessary for integration	likely to have a smart phone,
39	**Ward Christopher, 2009** Musical exploration using ICT in the middle and secondary school classroom	Action research	Creativity with ICT in a music class. Pupil followed the constructivist philosophy and went beyond the information that they were given	189 pupils aged 11-16	Questionnaire, Video interview Audio recording Teacher lesson log and Pupil evaluation form	Pupils are more inventive and motivated	Specific ICT in specific subject and then specific outcome
40	**Hurrell, S. A. 2015** Rethinking the soft skills deficit blame game: Employers, skills withdrawal and the reporting of soft skills gaps.	Mixed method with Case study design.	Employment survey in Scotland involving small scale businesses	3 public establishment		Managers should blame soft skill gap on skill withdrawal instead of individual, family and govt. more blame on managers who fail to contextually integrate	Only two service sub sectors were used, making use of multi – site hotels. The research can extend to retail and other businesses with sophisticated employment practices,

						selection, induction and training practices with their skills needs.	including small scale businesses
41	**Knights Carol, 2009** The perceived impact of ICT on mathematical learning by mathematics teachers in the UK	Quantitative study	Assessment of the contribution of ICT in mathematics education by small group of Mathematics teachers	Seven secondary school teacher from mathematics department. totally 44 teachers	Questionnaire	The comparison of ICT usage in math classes from 2004 till 2009 still show underutilization of ICT in the classroom by teachers	school's results rather than individuals results were reported
42	**J. Voogt, G. Knezek, M. Cox, D. Knezek and A. ten Brummelhuis …….2013** Under which conditions does ICT have a positive effect on teaching and learning? A Call to Action	Discursive paper	Joint forces on the implementation of ICT in educational practice	Seventy international policy makers, researchers and practitioners	Documentary analysis	A review on the role of ICT in the 21st century in order to realize the potentials of multiple technologies in the classroom was agreed on	

43	**Kelly Shapleya, Daniel Sheehanb, Catherine Maloneyb and Fanny Caranikas-Walkerb….2011.** Effects of Technology Immersion on Middle School Students' Learning Opportunities and Achievement	Experimental research	Comparison between the 21 middle schools that received laptop for each teacher and student	21 middle schools as the experimental group and 21 schools as control groups. These were divided into 2 cohorts (grade 6 -8 during three implantation year) and (grade 6-7 for students during two implementation years)	Middle school students who attended school with technology emersion and those without	Technological immersion had positive impact on students' technology proficiency, group interactions and increased frequency of technology based activities.	There was a positive correlation between technology immersion and students technology proficiency, and small group interaction
44	**Voogt, J….2010.** Teacher factors associated with innovative curriculum goals and pedagogical practices: differences between extensive and non-extensive	Discursive paper based on SITES 2006	Investigates the difference between extensive use and non-extensive use of ICT among science and math teachers to assess their level of impact on pedagogy and lifelong learning	22 countries were involved due to their extensive use of ICT and lifelong learning orientations which are necessary for 21st C	Documentary review	Prolonged use of ICT among science teachers resulted in improved confidence and competence of ICT use. They also had enhanced pedagogic experiences	

	ICT-using science teachers						
45	**Kwok-Wing Lai and Keryn Pratt, 2004** Information and communication technology (ICT) in secondary schools: the role of the computer coordinator	Mixed Method	This study investigates the role of ICT in 21 schools in one region in New Zealand. it also investigated the role of ICT coordinators in the school	All ICT coordinators in all secondary school were given questionnaires and 14 of them were interview	Questionnaire and interview	The findings suggests that the ICT coordinators were well equipped in their schools and as such should be more efficient. However there were some identified obstacles to effective leadership in ICT use in their schools.	
46	**Biagi, F., 2013** Measuring ICT Use and Learning Outcomes: evidence from recent econometric studies	Discursive paper/ survey research	The study investigates from the PISA 2009 results in 23 countries, the intensity of use of the computer on gaming activities as against school curricular related activities, inn mathematics,	23 countries were involved in PISA national test online	Online survey	The outcome of this review shows that there is a decrease in intensity of use of computer when students are on school related activities. However,	

			reading and science			there is correlation between computers breath of use and PISA test results	
47	**Tearle Penni, 2005** The role, current, practice and potential for the use of ICT in physical education in secondary school: a pilot study	Research based qualitative study	The study investigated the use of ICT in Physical education class. It Investigated teacher and student attitude on ICT use, barrier for uptake, competence and confidence levels	11 -14 year age group was involved (Key stage 3)	Questionnaires and focus group interviews	There was a positive attitude displayed by the teachers and coordinators in their specialist areas. As well as also evidence of actual use	
48	**O'Bannon, B.W. 2014** Teacher perception of Using Mobile Phone in the classroom: Age matters	Research based quantitative study	Examined the digital-native immigrant discourse. it focused on age to ascertain teachers support to the use of mobile in classroom based on the type of phone they had	1095 teachers from two states in the US	questionnaires	Older teachers had less access to mobile phones and as such possess less skill required for implementation of mobile phone for classroom instruction	Older teachers didn't perceive the usefulness of mobile phones in education

49	**Oldknow Adrian, 2009** Their world, Our world, bridging the divide	Discursive paper	Examines a new form of digital divide among student- the way student use ICT for themselves vs the way they are expected to use ICT at school	Various Schools in the UK	NA	Suggestion on how to reduce the digital divide by involving students in their own learning. Relate mathematical activities to a world that is familiar to the students	
50	**Bradley, Ray, 2008** Case study: Tonbridge School	Case study	This study investigates how a school can equip students for work skills	A school comprising of 750 boys participated with their teachers in EDCL computer lessons specially designed for the school	Year 9 -11 were involved and subsequentl y altered to accommod ate	The school's aim, to promote confidence and self-esteem among teachers and pupils through the EDCL was met as they tailored some generic skills as the programs to learn in the EDCL	
51	**Shury, J., Vivian, D., Spreadbury,**	Survey research	Employers perspectives on engagement and	18000 employers across the UK	questionnai res	The survey highlights more employer	Only a small proportion of employers

	K., James, A. S., Tweddle, M., Jones, R., and Constable, S. (2014) Employer Perspectives Survey 2014		training with providers, school, colleges and individual on the right work skills needed in employment sector			recognition of work experience through placement. more UK employers are engaging with schools	offered work placement to school and college students
52	**Richens, Greg P.; McClain, Clifford R, 2000.** Workplace basic skills for the new millennium.	Quantitative research / descriptive research design	Perceptions of employees on the importance of work place basic skills	400 employers were engaged in a survey	questionnaire	Over 90% of the participating employers perceived positively on SCANS competencies for entry workers needs	There is disparity between the entry level employee need skill and the skills that the entry level employee currently possess
53	**Oliver, R., Herrington, J. and McLoughlin, C. (2000).** Exploring the Development of Students' Generic Skills Development in Higher Education Using A Web-	Action research	The practice and development of generic skills through web based learning environment, especially problem solving skills	HE students in one class in a university	Questionnaire and interview	There was a high level of student perceptions of their environment as an enabling factor for the practice of the generic skills being taught	

	based Learning Environment.						
54	**Felstead, A., Gallie, D., Green, F., and Zhou, Y. (2007).** Skills at work, 1986-2006	Survey research	This survey investigated the need for skills in the employment sector, as a way of assessing the gains of educational expansion, and monetary investment in the educational sector	Cross section of workers aged 20 – 65 on skills directed to the workers themselves	questionnaire	Britain experienced rise in generic skill requirement with 10% increase in graduate jobs. It also identified a mis-match between qualification demand and supply	
55	**Felstead, A., and Green, F. (2008).** Skills at Work in Scotland, 1997 to 2006. Glasgow, Scottish Enterprise.	Survey research					
56	**Felstead, A., Green, F., and Jewson, N. (2012).** An analysis of the impact of the 2008–9	Discursive paper.	It investigates how training activities have fared in economic recession. It discusses the	52 employers were interviewed and also given questionnaires	Questionnaires and interviews	The outcome shows that the UK training is linked to the economic cycle. Despite the severity of	Limited empirical evidence

	recession on the provision of training in the UK. Work, employment and society		impact of recession on training in the UK			the recession, was cut by half in spite of the recession. package is able to be sustained in then re	
57	**Green, F. (2009).** The growing importance of generic skills. Beyond Current Horizons: Work and employment.	Discursive paper				There is evidence that cognitive and interactive skills are growing in the UK	
58	**Badia, A., Meneses, J., Sigalés, C., and Fàbregues, S. (2014)**Factors Affecting School Teachers' Perceptions of the Instructional Benefits of Digital Technology	Research based Quantitative study	The study investigated teachers' perceptions of the instructional benefits of ICT in teaching. These instructional benefits include curriculum development	702 teacher from 356 primary and secondary school	questionnaire	The study confirms that teachers positive perceptions of ICT impacts on their use. Other factors that aid their perceptions include internet access, teaching area, and digital literacy.	Mixed sample group

59	**Helsper, E. J., and Eynon, R. (2013).** Distinct skills pathways to digital engagement.	Research based Survey research	Investigates the differences in internet skills and engagement, from the national survey data on internet use in Britain		questionnaire	Digital engagement is best understood when you link literacy to it. Socio demographic factors can impact digital skills which in turn affects digital engagement	
60	**Haydn, T. (2008).** Teacher education and ICT: some points for consideration from the UK: OECD–CERI						
61	**Hasluck, C., and Armitage, J. (2011).** Employers and the recruitment of young people (16-18 year olds): an evidence review.	Discursive paper	An evidence review on employers and recruitment of young people, after the recent UK recession which showed young people to be more vulnerable	NA	Questionnaire	The study discovered that patterns of employment behavior showed that a few employers had employed 16 -18 yr old from school and when the	

						do it is through informal channels.	
62	**Halsey, K., Murfield, J., Harland, J. L., and Lord, P. (2006).** The Voice of Young People: An Engine for Improvement?: Scoping the Evidence: Nfer.	Discursive paper	The study evaluates the impact of studies that had young people's voices since 2000. It also looked at the evidence confirming young people impact on policy and fellow young people, NAincluding the location of these studies.	NA	26 papers met inclusion out of a total 52	The study identified that there is a growing culture of participation involving young people which has helped in directing policy, impact of young people behavior	No systematic impact studies were recorded in the documentation / literature review
63	**Eynon, R., and Malmberg, L.-E. (2011).** A typology of young people's Internet use: Implications for education.	Research based paper	The study investigates and distinguishes young people internet use levels to identify if there are coherent contextual factors associated with their use this will enable policy makers to	Survey involving over 1000 young people in the UK examining their use of the internet outside the formal school setting	Questionnaire	The study discovered four types of internet usage profile namely, the peripherals, normatives, all-rounders, and active participators	

			support their use more effectively and enhance education and learning				
64	**Dede, C. (2010).** Comparing frameworks for 21st century skills. 21st century skills: Rethinking how students learn.	Discursive papers	Investigates what 21st century skill is about and the processes that the teacher can take to teach students the skills	NA	Documentary analysis	There were comparison of 21st C skills which were consistent among various companies and is also consistent with classroom skills	
65	**Davidson, J. K., and Elliot, D. (2007). A comparison of e-learning in Scotland's colleges and secondary schools: the case of National Qualifications in 'Core Skills**	Mixed study	Investigate how online resources are utilized in the college sector and school. The aim was to test the rate of core skills development	Survey carried out in colleges and secondary schools randomly. Four case study for interview. The study used online core skills materials in Numeracy, Communication, Information Technology (IT), Problem Solving and	Questionnaire and survey	There were benefits for less motivated students as the materials for data collection were contextualized to the students environment. Secondary school teachers displayed no knowledge of virtual resources	This eventually will leed to training issues for the secondary school teachers

				Working With Others			
66	**Conole, G., De Laat, M., Dillon, T., and Darby, J. (2008). 'Disruptive technologies','pedagogical innovation': What's new? Findings from an in-depth study of students' use and perception of technology**	Research based – mixed method	An exploration of students experiences of e-learning	In depth case studies across four disciplines in Higher education in UK	Survey, audio logs and interviews	There is an understanding that students are highly immersed in technology rich learning environment, making them to select technology based on their own learning needs	This has implications to the way the educational institutions select and design their their learning activities
67	**Casner-Lotto, J., and Barrington, L. (2006).** Are They Really Ready to Work? Employers' Perspectives on the Basic Knowledge and Applied Skills of New Entrants to the	Discursive paper	Investigates the work readiness of new entrants into the US work force by level of educational attainment	A sampling of a dozen HR officials and other senior personnel	In-depth survey and interview	Employers rated reading and comprehensio n in English, written in English as the most important skill for a school leaver. They generally noted that basic knowledge and applied skill	

	21st Century US Workforce.					increases with educational level	
68	**Bowman, D., Borlagdan, J., and Bond, S. (2015).** Making sense of youth transitions from education to work**.**	Discursive paper	Investigates the reasons behind increasing youth unemployment, for the age group of 15-24 years in Australia	Meta review of youth transition policies and programs. These include OECD, Int. Labour org (ILO) EUROFOUND, The European observatory review, EC and World Bank	Policy documents	Suggests the need for a multidimensional and multifaceted approach, with a balance between government employers and service providers on assistance to young people	There has been increased rate of uncertainty between end of secondary education and securing a satisfactory job
69	**Higgins, S., Xiao, Z., and Katsipataki, M. (2012).** The impact of digital technology on learning: A summary for the education endowment foundation. Durham, UK	Discursive paper based on research studies	Identifies a shift in focus from whether ICT is being used in teaching and learning to understanding which ICT to use in teaching and learning	Systematic review of 48 studies which synthesized the impact of technologies on attainment in school using 5-18 years	Policy documents	Identifies collaborative use more effective. Short but focused intervention within regular use	Recommends that careful thought should be applied before using technologies
70	**Davidson, J., (2006)**	Qualitative study	This study evaluated the	48 students divided in group	Interview	Students confirmed	There might be complex

	Perspectives on digital technology in a remote rural school: a qualitative study		perceptions of teachers, pupils, parents and community partners on digital technologies in schools. It also assessed embedding ICT in the school curriculum	of 8 mixed gender, 18 one to one interview with staff		improvement in working with others, developed creativity skills in curricular and extra-curricular activities. Teacher had improved ICT skills from the project	issues in trying to implement digital studies in other remote parts of Europe
71	**Stockford, A., (2008)** What are the perceptions of stakeholders in both the UK and Germany in relation to the teaching and learning of ICT and its relevance in the work place	Quantitative Comparative study	A review of the aims of the Lisbon strategy and particularly to compare teaching and learning in Germany and Britain in order to evaluate their relationship to their local workplace and impact on the delivery method used to promote effective teaching and	Studies in Germany and UK14-16 years in schools in Germany and KS4 in the UK in full time education. 3 schools in the UK involving 110 pupils and 8 teachers and 1 school in Germany involving 84 students and 5 teachers	questionnaire	There is need for the British industry to closely match their needs to the skills matrix of the local people leaving compulsory and post compulsory education. There were positive perceptions among all on keyboarding skills for	The research instrument did not make room for in depth response and as such reflected on a high number of the selection of the option 'No response'

			learning of ICT in the UK			FE/HE and work	
72	**Hennessy, S., Deaney, R., Ruthven, K., and Winterbottom, M. (2007).** Pedagogical strategies for using the interactive whiteboard to foster learner participation in school science.	Qualitative study with a case study approach	Investigates the pedagogic benefits from the interactive white board(IWB) on science subjects	Focus group interview with four secondary science department, plus lesson observation and interview with two teachers and their pupils	Focus group interview	The study revealed the positive values of pupils' manipulative skills of objects on the IWB. It encourage social participation and active cognitive opportunities	The school culture and subject cultures were restrictive factors for demonstrating social participation. Data analysis was done from a socio cultural perspective of learning
73	**Deaney, R., and Hennessy, S. (2007).** Sustainability, evolution and dissemination of information and communication technology-supported classroom practice	Qualitative study - Collaborative program	Investigates whole school approach towards embedding ICT in teaching and learning within and outside subject departments. The study developed a range of pedagogical strategies	Teachers from five schools in England, totaling 16 in number	Interview of 16 teachers and 9 of their colleagues	The study discovered both supporting and constraining factors. Adequate access to ICT resources, development of ICT as school priority, teachers confidence, skills and	

			involving use of ICT			motivation towards ICT use were the supporting factors.	

Appendix M: Teachers Interview questions

Teacher Interview questions

1. What are your perceptions on the explicit role of ICT in schools as recommended by the Curriculum for excellence, towards developing generic skills among pupils?

2. What forms of ICT do you use in your teaching and why?

3. How do you feel using these ICTs in your teaching?

4. How do you perceive the role of ICT in school towards addressing or meeting the individual pupils' needs for post school transition?

5. How has the current curriculum affected your delivery and work as a teacher towards impacting generic skills?

6. What skills, in your opinion, will be developed or supported from the ICTs that you are using in teaching and why?

7. What are your perceptions on the assessment and evaluation measures on pupils skill acquisition gain from your delivery?

8. What are the challenges or difficulties faced with the delivery with and through ICT as recommended by the CfE?

Appendix N: Pupil Interview question

Pupil Interview question

1. How did you acquire the skills in using ICT?
2. How is your access to ICTs in school helping you for your post school destination?
3. How do you perceive the delivery of ICT in your school? And how can it be improved?
4. What type of transferable skills have you developed from the use of ICT in School and how important are they to you?
5. Has the skills acquired in school been relevant to what you want to do after secondary school?
6. What can be done in school to effect a smooth transition for you beyond schools?